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API Platform Business Model for the Case Company

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Abstract

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The objective of this thesis is to propose a possible API Platform business model solution to the case company addressing the mining and minerals sector. The need being that the case company has initiated an internal digital transformation strategy to become leading Nordics API solutions partner and looking forward to quickly create a reference case of digital collaboration within the mining and minerals sector.

This study is based on using qualitative research methods. Upon identification of the objective, the current state analysis was conducted by conducting internal and external interviews, researching available internal documents, intranet of the case company and analyzing one competitor. Themed interviews were conducted with the identified internal staff and the staff of the identified customer. This exercise helped to understand the current state readiness of the API Platform business model within the case company against the customer needs. A competitive analysis on one leading API centric solutions provider from the Nordics was done to get a view from the market. Triangulation of data collection was ensured by involving informants and documents from business, technical and architecture organizations of the case company and the identified customer. The current state analysis phase of the study pointed out that API platform business model is the key element of the digital transformation strategy. However, there is a need to develop necessary models for implementing it. This resulted in identification of the focus area of developing a new API platform business model. The study continued to investigating available knowledge and industry best practice for selecting relevant elements in order to develop such a model for the case company. The theoretical framework and identified elements of knowledge were then applied in order to co-create a solution proposal of API Platform business model.

The outcome of the thesis is a co-created solution proposal that was developed and validated with the business, architecture and technical responsible stakeholders from the case company. The recommendations and evaluations from the experts led to creating the final proposal of the API Platform business model for the case company. The implementation of the proposed API platform business model will help the case company achieve a key milestone in its own digital transformation strategy, obtain a reference case in the mining and minerals sector of the Nordics market, and develop new revenue streams.

Keywords	API Centric solutions, API Platforms, API Platform business model, API Business mode, API Economy

Glossary

API	Application Programming Interface
Cloud Service	A wide range of computing services provided to customers virtually generally over the internet, hosted on globally located data centers
DevOps	Development and Operation. A model where application development, testing, deployment and production operation are managed by a single team in an agile way
Disruption	Challenging current business models and sectors by using a new technology
EU GDPR	European Union General Data Protection Regulation
IaaS	Infrastructure as a Service
PaaS	Platform as a Service
Platform	a business model that creates value by facilitating exchanges between two or more interdependent groups, usually consumers and producers
Intelligent API Platform	Technical representation of Platform definition hosting a collection of APIs and allows complete APIs lifecycle management. Intelligence is enabled using infusion of Machine Learning, Artificial Intelligence and Advanced analytics
SAFe®	Scaled Agile Framework, operating model for agile enterprise
OLA	Organizational level agreements, wherein front offices have contractual agreements with the back-offices for service delivery
SLA	Service Level agreements, wherein vendor agrees to deliver services to the customer as per contracted levels of services

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1 Introduction

The present-day world is undergoing unprecedented disruptions and traditional ways of doing businesses are being challenged. Brick and mortar presences of businesses are fast going into oblivions and economies are being driven by data. Enterprises have started to feel the impact of continuing the traditional ways of working on their brand value along with people, processes and technologies and, are therefore forced to introduce a paradigm shift in their enterprise strategies.

Industry 4.0 has revolutionized by enabling devices to communicate with each other and with operations control centres via IoT. Data is being generated at speed and at scale. Analytics infused with Artificial Intelligence is predicting accurately, allowing humans to prevent breakdowns and mishaps by taking corrective actions in time. Robotic Process automation and chatbots are effectively executing repetitive tasks helping humans to focus on more productive tasks.

In the connected world, digital economies are transforming the ways of conducting businesses. Enterprises have understood that unlocking of value can be realized over acquired business data, unique algorithms, and or developed expert business processes, if those can be digitalized and safely shared outside organizational boundaries and at scale by means of collaboration within the digital economies. One of the digital economies allowing qualified enterprises to conduct such collaborative businesses is the API economy and an innovative and collaborative business model enabling the API economy is the API platform business model. The API platform business model enables API economy partners to collaborate by safely and repetitively sharing or utilizing shared digital assets such a data, unique algorithms, expert business processes via a set of APIs hosted on an API Platform to produce solutions for the API economy. Well-known companies such as Amazon, Salesforce.com, Netflix have successfully made API platform business model as their core business model and generating immense value in the modern world.

This focus of this thesis is on the API platform business model and to develop a solution proposal of the API platform business model for the case company.

1.1 Business Context

The case company of this thesis is part of a global ICT service provider and hardware manufacturer. It offers a range of technology product based solutions to its customers from industries such as mining and minerals, logistics, oil and gas, pulp and paper industries. It is also continuing to embrace its new identity as a leading digital transformation partner and player looking to contribute towards customer's digital transformations. Profiled customers of the case company are typically looking for reducing cost through digital transformation, trying to become a niche player in their market of operations through digital co-creation & co-innovation, and unlock value through digitalization of assets. Hence, they are looking for digital transformation partners like the case company to help them with the necessary knowhow, expertise or provide an ecosystem to co-create and co-innovate.

1.2 Business Challenge, Objective and Outcome

Digitalisation has become the cornerstone business strategies of modern enterprises. Year on year, the digitalization on boarding is accelerating at a mind-boggling pace. An interesting new approach is API platform business economy to achieve the value unlocking of the enterprise assets.

API centric platform business companies use other modern technologies such as cloud services and globally available API gateways. They create industry and mission specific global scale IT systems with open interfaces for customers, suppliers and third-party developers to join as collaborators and conduct seamless and at scale data driven and or transaction driven businesses. APIs are pre-defined interfaces for other parties to obtain or post required data from other systems, applications and databases. They are the key enablers of an API centric platform business model allowing accelerated business value unlocking. Hence, the case company is investigating possible API platform business model(s) solution to collaborate with the identified customer within the API economy of the mining and minerals sector.

Accordingly, the objective of this study is *to propose an API platform business model to the case company,* whereas the thesis outcome will be *a proposal for the API platform business model.*

1.3 Thesis Outline

The scope of this thesis is to develop a solution proposal of an API Platform business model for the case company in order to co-create API economy solutions with the identified customer from the mining and minerals sector. This thesis will research the case company´s and industry best practices in use while respecting the GDPR, as well as case company´s compliance rules and guidelines.

The method used to conduct this study is a combination of external and internal themed interviews, researching internal documents of the case companies, competitor analysis and the data collected from its website. The corona pandemic limited the thesis to conducting the necessary interviews online. Furthermore, confidentiality has been respected by way of adherence to the established GDPR compliances, applicable policies of the case company and identified customer and taking into consideration requests of the involved participants.

This thesis is written in seven chapters. Chapter 1 is the introduction giving the background and context to the thesis. Chapter 2 covers the methods and materials. Chapter 3 is descriptive in nature and covers the current state analysis of API Platform business model in the case company. Chapter 4 explores the existing knowledge and industry best practice from the available literature and business publications. Chapter 5 presents a draft solution co-created with identified key stakeholders and is based on the conceptual framework from Chapter 4. Chapter 6 reports on the results from the validation of the draft proposal. Chapter 7 is dedicated to the executive summary, manager implications, evaluation of the thesis and closing words.

2 Method and Material

This chapter describes the research approach, research design, data collection and analysis methods used during the study.

2.1 Research Approach

The research approach tells how the research is carried out and which methods are selected to be used. Research can be defined in various ways. In the end, “research is about making diligent searches, inquiries, investigations or even experiments to discover new facts or findings” (Adams et al., 2014, 1-2).

First, as for *the research families*, research can be classified into two main categories, *fundamental or basic* research and *applied* research (Sreejesh et al., 2014). Fundamental research is defined by Sreejesh et al. (2014) as follows: “Basic research refers to a focused, systematic study or investigation undertaken to discover new knowledge or interpretations and establish facts of principles in a particular field” (Shreejesh et al., 2014, 4). Whereas, applied research is defined as: “Applied research refers to investigation undertaken to discover the applications and uses of theories, knowledge and principles in actual work or in solving problems” (Sreejesh et al., 2014, 4). This definition of applied research is also echoed by Baimyrzaeva (2018) who says that: “a research that takes place in an everyday context to solve specific problems of individuals, organizations, and/or industries is called “applied research” (Baimyrzaeva, 2018, 6). The goal of most research in applied studies is “to find the answer to some question or solution to some problem and translate that answer into findings or reports that may lead to practical decisions of one kind or another” (Lapan et al., 2011).

Other distinction between the research families relates to the selection of research methods. There are quantitative and qualities research, as well as mixed that used both types of methods. Thus, there are different *research methods* to be chosen based on requirements and nature of the problem being researched. Adams et al. (2014) define a research method to be “a way of conducting and implementing the research. When conducting research, the researcher usually applies multiple methods to serve best the goals of the study”. “Sometimes, the nature and the scope of the study necessitates using hybrid complimentary combinations of research families such as qualitative

supported by quantitative, desk study plus field study and so on" (Adams et al., 2014). "Quantitative studies use quantitative research methods that are focused on using statistical methods and giving a number based responses to the research questions. Qualitative studies use a wide range of qualitative methods, such as interviews, observations, document analysis, etc. Qualitative researchers' interactions with individuals and communities, however, provide fertile ground for the emergence of ethical dilemma" (Lapan et al., 2011) that need to be thought out in advance and taken care of in the research process.

While conducting a study, it is critical for the researcher not only to select a research family, but also select *a research strategy/approach* to achieve the goals and objectives of the study. Kananen (2013, 27) defines the research approach to be "A broad approach to a problem is called a research methodology or approach". Kananen (2013, 33-35) further guides the study researcher to consider research methods and deliverables while selecting from the research approaches of case studies, action research and design research. According to Kananen (2013, 37-38), the case study aims to understand some phenomena based on the detailed examination of cases. Kananen (2013, 41) defines that "the action research aims for change, participation in the change by the researcher and the realization of the change cycle" whereas, design research, which is otherwise similar to action research, "does not require participation by the researcher in the same way as action research" (Kananen, 2013, 45.) For this study, design research approach is found to be most suitable.

For this study, qualitative research method is used. The qualitative data will be collected from the participants by conducting interviews and documenting it, in the form of recording and field notes for analyzing and obtaining results. Additionally, qualitative data will be collected from the available internal documentations and intranet of the case company, available knowledge articles, published white papers and, from the website of one competitor of the case company.

In this study, design research approach is used. Reasons being that Kananen (2013, 20) defines the outcome of design research approach to be a "functional and practical solutions". This study aims to develop a functional, practical solution proposal for the case company. Moreover, in this study, the study researcher will not be participating in the change and realization of the change cycle (Kananen, 2013, 45.) This study is exhibiting characteristics shown by studies using design research approach (in the logic

of Kananen, 2013, 20,45). Hence, it can be concluded that this study qualifies for using design research approach.

2.2 Research Design

“Research design can be defined as a framework or blueprint for conducting business research project in an efficient manner. It details procedures necessary for collection, measurement and analysis of information which helps the researcher to structure/or solve the business research problem” (Shreejesh et al., 2014, 27.)

The research design for this thesis is shown in Figure 1 below. The research design considered for this thesis consists of five steps starting with setting of the objective and ending with final solution proposal.

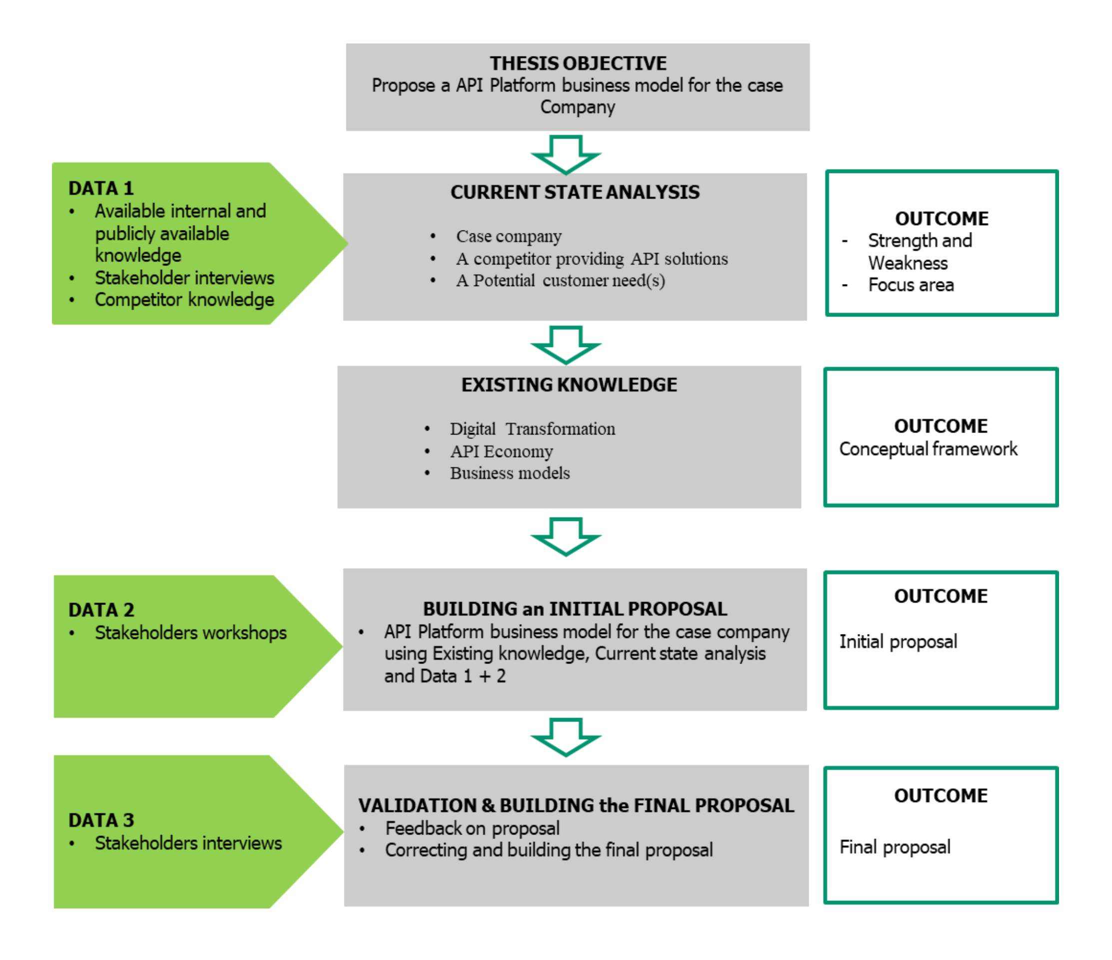


Figure 1. Research design of this Thesis.

As shown above in Figure 1, step 1 sets the objective and establishes the direction of the study.

Step 2 focused on conducting the current state analysis on the existing capabilities of the case company, a competitor providing API led business solutions and potential requirement of the identified customer. The key findings and observations yielded from this step are summarized into strength and weaknesses of the current API business of the case company. Focus area for the development is then selected based on the identified weaknesses.

Step 3 concentrates on exploring the available knowledge, business literature and industry best practice related to the API economy, API platform business, and relevant business models that are studied to construct a conceptual framework for developing a solution in the next steps in this study.

In step 4, an initial solution proposal is co-created using the conceptual framework from step 3, and results of data collection round 2 with the key stakeholders.

In step 5, a final proposal is co-created based on the validation feedbacks from the key stakeholders.

2.3 Data Collection and Analysis

This study engaged a variety of data sources spread over three data collection rounds as shown below in Table 1. As seen from Table 1 below, data for this thesis was collected in three rounds between the period of February to June 2022, by conducting themed interviews, analyzing available internal documents, the case company intranet site and website of one competitor.

The first round, collecting Data 1, was conducted for the current state analysis. Themed interviews were conducted with the internal staff between February to April 2022. The interviewed internal stakeholders included Enterprise architect, Domain solutions architect (mining and minerals sector), Business development manager, and account manager of the identified customer.

Data was also collected by conducting themed interviews with the external staff belonging to identified customer from the mining and minerals sector. The interviewed external staff were Enterprise Architect, Solutions Architect (products and spare parts), Manager (Applications Integrations), and IT Security manager of the identified customer.

Then, data was collected for conducting a competitor analysis from the website of one market competitor to understand the current state of the case company from market perspective. Additional data was collected from available internal documents and intranet of the case company on availability of API platform business models with the case company, strategy, vision and mission of the case company, situation of internal transformation, cloud hosted solutions, and the nature of current solutions being offered.

While these datas collected during data collection Data 1 from internal documents, intranet and one market competitor, presented other possible scenarios, the data collected through the interviews formed a crucial part to understand the "on-the ground" prevailing situation in respect to the API platform business model within the case company.

Table 1. Details of Data collections 1-3 used in this study.

	Participants / role	Data type	Topic, description	Date, length	Documented as
	Data 1, for the Current state analysis (Section 3 or 4)				
1	Respondent 1: External, Enterprise Architect	Teams meeting	Potential customers Enterprise architecture strategy	Feb'2022 60 min.	Field notes
2	Respondent 2: External, Solutions Architect, Products and spares	Teams meeting	Potential customers pain points and needs for API based platform solution	March'2022, 60 min.	Field notes and recording
3	Respondent 3: External, Manager, Applications Integrations	Teams meeting	Integration services provided to the potential customer under existing collaboration	March'2022, 60 min.	Field notes
4	Respondent 4: External, IT Security Manager	Teams meeting	Potential customers Information and security policies	March'2022, 60 min.	Field notes
5	Respondent 5: Internal, Account Manager	Teams meeting	Potential customers needs for API Platform based solutions	April '2022, 60 min.	Field notes
6	Respondent 6: Internal, Business Development manager	Teams meeting	Business models of the case company	April '2022, 60 min.	Field notes
7	Respondent 7: Internal, Enterprise Architect	Teams	Enterprise architectue strategy of the case company	April '2022, 60 min.	Field notes
8	Respondent 9: Internal, Domain solutions architect, mining and minerals sector	Teams meeting	API Platform solutions offerings of the case company in the mining and minerals sector	April '2022, 60 min.	Field notes
	Data 2, for Proposal building (Section 5)				
9	Participant 8 Internal, Enterprise Architect	Discussion, Teams meeting	Co-creation of the Proposal	May'2022, 60 min.	Field notes
10	Participant 9 Internal, Business Development Manager	Discussion, Teams meeting		May'2022, 60 min.	Field notes
11	Participant 10 Internal, Account Manager	Discussion, Teams meeting		May'2022, 60 min.	Field notes
	Data 3, from Validation (Section 6)				
12	Respondent 12.: Internal, Enterprise Architect	Teams meeting	Validation and Evaluation of the Proposal	Jun'2022, 120 min.	Field notes and recording
13	Respondent 13: Internal, Business Development Director				
14	Respondent 14: Internal, Business Development manager				
15	Respondent 15: Internal, Account Manager				
16	Respondent 16: Internal, Technical Development manager	Teams meeting		Jun'2022, 90 min.	Field notes and recording
17	Respondent 17: Internal, IT and Cyber secutiry manager				

As seen above from Table 1, in the next round i.e. Data 2, data was collected to gather suggestions and inputs from the internal staff to co-create the solution proposal. This data included inputs on the enterprise architecture strategy of the case company,

possible opportunities, Enterprise security and data privacy policies, business development, partners and purpose of the API platform.

In the third round i.e. Data 3, data was collected during validations of the initial proposal of API platform business model. Data 3 included development feedbacks on the proposal from the experts belonging to architecture, business and technical line organizations of the case company.

Additionally, in the current state analysis stage, available internal documents and information from the intranet of the case company were analyzed as shown below in Table 2.

Table 2. Internal documents used in the current state analysis, Data 1.

	Name of the document	**Number of pages/other content**	**Description**
A	Vision Document	15 pages	Vision and strategy
B	API services	3 Page	Product Capabilities Overview
C	Platform Capabilities framework	30 pages	Integration Platforms tech, toolsets and framework capabilities
D	Next generation Platforms	5 pages	Insights into next generation platform use cases
E	API Management	40 pages	API Lifecycle management capabilities in case company
F	Intranet	Sharepoint site	History of API and transformation

As seen above from Table 2, this study also analyzed a number of internal documents to get an understanding of strategy and vision of the case company, derivation of themes, the market trends and a fair assessment of capabilities of the case company. The analysis also presented an opportunity to calibrate and corroborate the internal staff's opinions.

Once all the necessary data was collected from various sources in data collection round Data 1, the current state analysis was conducted to obtain findings as discussed in chapter 3 below.

3 Current State Analysis of the API Platform Business of the Case Company

This chapter discusses the process followed and results obtained from the current state analysis (CSA) of the case company within the API Platform economy business.

3.1 Overview of the Current State Analysis

This current state analysis (CSA) was conducted with an objective of understanding the case company's current state of readiness for the API platform business economy. It analyzes the existing state from three perspectives i.e. (a) the case company, (b) one well known competitor providing integration solutions, and (c) expectations of a mining and minerals sector customer identified from the case company. The current state analysis consists of four step and was conducted during the period of February'2022 to April'2022.

The first step focusses on internal analysis of the case company's current state of readiness in terms of availability of API platform business models, and the API platform setup and capabilities in respect to digitalization requirements of the identified customer from the minings and minerals sector. Themed interviews were conducted in online mode alongside research on the case company's intranet site and internal documentations on the API platform-based initiatives. Online mode interviews were preferred by the majority of the participants due to prevailing corona pandemic situation.

The second step covers analysis of the integrations and API platform-based solution capabilities of one market competitor. The competitor is a strong provider of consulting and run services solutions across the stack of digitalization layers in the Nordics market. The data collection for this analysis was done by internet search and skimming through data and content available from the competitors' own website.

The third step covers analyzing the needs of identified customer from the mining and minerals sector. This exercise was executed by first conducting themed interviews with identified informants belonging to the organization of the customer. The collected data were then turned into and fields notes and analyzed, and the results were obtained to understand the API platform business requirements of the customer.

In the fourth and final step, the main findings from the current state analysis were summarized and presented. The conclusions were drawn and presented as summarized strength and weaknesses of the current API platform business of the case company. Identified key weaknesses were used to select a focus area to conduct further development steps in the study.

3.2 Description of the API platform business model within the case company

The case company is based in Finland and known in the Nordics market as a strong provider of end to end IT solutions, consulting and services. The parent of the case company has initiated internal transformation of becoming a leading digital transformation player at a global scale. As a result, the case company has initiated own internal transformation with an objective to become a leading digital transformation player to its customer base in the Nordics. On the other hand, by virtue of existing partnerships, the Nordic customers of the case company are seeking digital transformation services and solutions such as consulting, implementation, providing and management of API based ecosystem to allow unlocking value of own digitalized installed based data assets with an aim to become a grow up their own value chain and become a niche leading player in own industry.

One such industry sector where the case company has an existing IT solutions and services providers collaboration is mining and minerals sector. The customer from this industry sector is now seeking transformative solutions from the case company in-order to participate in the API economy of mining and minerals sector by means of safely sharing own digitalized installed base data.

Furthermore, the identified customer of the case company from the mining and minerals sector is exploring a possible collaborative setup wherein, while it can provide digitalized installed based data assets, it expects the case company to provide the necessary API platform capabilities. It is expected that the case company will own and operate the platform, develop, maintain and manage the platform services and the APIs lifecycle hosted on the platform. Besides, it is expected that case company will also be responsible for selling and onboarding of the demand side to the API platform.

The case company is now exploring a possible business model to implement and develop the API platform capabilities to be offered to the identified customer. This need presented an opportunity for the researcher of this Thesis to initiate and conduct this study.

Briefly, an API platform business model is an innovative and collaborative business model. It enables an enterprise to collaboratively participate in the API economy. The API platform business model is guided by API First policy on the Enterprise architectural level. Effective implementation of API platform business model allows an enterprise to safely expose and share own digitalized data assets and those of collaborating supplier partners. It opens up the possibilities of enterprise to develop new capabilities and services by co-creating, co-conversion and capturing of value via meaningful collaborations.

3.3 Analysis of the API platform business model within the case company

The current state analysis started with conducting an in-depth analysis on the internal documents listed in Section 2.3. The aim was to gain a general understanding on the current state of readiness for modern business models such as API platform business model, capabilities and company's interests in the digital economy space.

The analysis of the Vision document revealed that the parent company has a clear strategy in place to become a strategic digital partner at global scale. Moreover, understood aim is to deliver digital solutions at industry level rather than at a specific customer level. A collaborative approach being taken to realize this strategy, as analysed, is that after identification of the market leaders in the various industries, co-innovate digital solutions and success stories will be created in collaboration with them at industry levels. Within this collaboration, the technical R&D units of the organization will provide the necessary technical expertise, setup and licensing whereas the industrial business expertise will be provided by the identified market leaders. The objective, as understood, is that this will allow the parent company and its local subsidiaries such as the case company to get deeply embedded within the blueprint of those industries and grow up the digital value chain, together, with the industry leaders. The Innovation platform document presented a forward-looking interesting use cases for industry level solutions in the digital economy space.

Based on the research on the case company's intranet, it was noted that circa 2016, the parent company of the case company allocated considerable budget to develop a home-grown cloud platform setup including IaaS, PaaS as a service and initiated the implementation. One key objective was to offer also API platform services on the top of the own cloud setup. With anticipated needs of cloud migration, digital transformation and monetizing of data assets needs of the customers and the general market, the positioning then was to provide an alternative to Azure and AWS cloud services while still retaining global level partnership with them. The cloud platform offered vanilla IaaS and PaaS to host the necessary applications of the customers. Whereas, the required integrations within the hosted applications were offered using internal API based mechanisms. The understanding around that time was that modern business models such as API platform business models and ready state API Platform setup can be developed, matured and offered when the market becomes ready with clear needs. The analysis of the document API and Integration services API management and API Management Introduction revealed that at present, offered APIs for realizing integrations are still mostly internal in nature catering to A2A (application to application) integrations and the API management functionality being offered is limited in nature. It was also gathered that the not enough work has been done specific to development of modern business models such as API platform business model.

When the results were obtained from internal documentation analysis, the next step was to conduct interviews with the identified internal stakeholders of the case company in-order to corroborate, calibrate and gain an in-depth understanding on the current state of readiness of API platform business model within the case company. The interviews were thematic in nature covering topics of culture, business models and tools, strategy and capabilities, Technology processes and capabilities, data, and Information security & data privacy. The involved informants were Enterprise Architect, domain solutions architect (mining and minerals), business development manager and identified customer's account manager. The conducted interviews were structured starting with introduction and objectives before going into details of those topics which were relevant to this study. At the end of the interviews, a summary recap was presented to ensure that the thesis researchers understanding is that in line with the information provided by the informants.

Most of the participants commented that there is enough awareness about the API economy in the case company and the benefits it brings to the collaborating partners.

Moreover, cultural changes have been introduced through change management though those are in general challenging. Communications are happening regularly via webinars, intranet publishing and email channels to make understand the internal staff about the changes being brought to the culture, technology and processes as a part of initiated enterprise level internal transformation.

> "*I know what API economy is"* (Account manager, identified customer of the case company).

Results from the conducted interviews further pointed out that home grown cloud setup is operational and functioning, with general and limited API offerings and API management functions. Additionally, it was also observed that there is still much work to be done in the areas of API platform business model. The parent company is now looking forward to create an API platform success story on the home-grown cloud setup for the Nordic customer base. On the other hand, almost all participants voiced concerns on the limitations of it being located outside European region and the challenges being presented while trying to sell it to Nordics market. It was also noted that the focus is still migration of the customer applications to the home-grown cloud setup and realization of integrations within those applications using internal APIs. This is not a comfortable arrangement for the Nordic customers as first, own applications and data being hosted outside European region and second, not able to utilize the offered cloud setup for market facing APIs in-order to collaborate and co-create value by sharing of own digital installed based data assets. Most importantly, it was highlighted that the identified customer has propriety of own installed base data and hence is un-willing to utilize such setup.

> *"Selling the own cloud setup to our Nordic customer base is very challenging as first of all they know the worth of their data assets. They also know that are better alternatives in terms of pricing, location and the contractual flexibility offered by Azure and AWS".* (Business development manager, case company).

> *"Offering our own cloud setup as an alternative to Azure and AWS for the API Platform economy is the directive we received from our parent company. But on ground situation is very different. We do not yet have necessary capabilities developed specific to the Nordics market or the mining or*

minerals sector, in particular and other limitations, in general". (Enterprise Architect, case company).

On the topic of availability of API Platform business models for the mining and minerals sectors, it was noted and agreed by all the participants that this is one area where work is needed to be done.

"Traditional IT landscape is our bread and butter. Many contracts are coming up for renewal or being renewed as we talk. So, our current bandwidth is being consumed there". (Business development manager, case company).

The domain architect having expertise in the mining and minerals sector presented an interesting picture. It was gathered during the interview with him that while the customers are looking for modern solutions, the offered solutions are still traditional in nature. According to him, there is no known case of mining and minerals sector solutions being offered based on API Platform business model within the case company.

"It is unfortunate that our customers from the mining and minerals sector are aggressively transforming themselves into API economy players, meanwhile we continue to offer traditional capabilities-based solutions to them" (Domain architect, mining and minerals sector, case company).

The Account manager was more critical as compared to the other informants as she was also representing customer's voice within the case company.

"My customer is modernizing their ways of working by undertaking digital transformation initiatives at various layers, they expect us to lead them in this journey. I know what API economy is, and given our good collaboration, can offer customer to on board with us in co-creation but I require some models and tools to convince the customer". (Account Manager, customer of the case company).

Based on the results of the internal documents analysis, interviews and stakeholder observations, following key takeaways were noted as shown below in Table 3.

Table 3. Summary of strengths and weaknesses of the case company´s current API platform business model.

	Strengths	Weaknesses
1	Required understanding of API economy is there and the parent company leadership is showing support.	Contract, models and templates does not exist for such type of services within the case company.
3	Transforming itself into a leading digital transformation player is derived from the strategy of the parent company	Transformation is taking a lot of time as change management is complex.
5	Case company has a ready state homegrown cloud setup offering IaaS and PaaS as a service. An API Platform setup can be quickly commissioned on this readymade infrastructure.	The homegrown cloud setup is located outside European region and hence customer prefer other leading market players such as MS Azure having European region presence due to data privacy, security, and stability concerns.
6	Case company is open to offer API Platform setup to its customer in the minings and mineral sector on other cloud partners such as Microsoft and Amazon through existing global scale partnership.	No ready state API Platform business model is available for the minings and minerals sector customer.
7	Case company is willing to explore initiatives to create an API Platform setup for the customer in the minings and minerals sector.	No proper API Platform business model yet exist for alternative cloud solutions.
8	API management capabilities, an integral part of API Platform setup exists within the case company	The API management capabilities are limited to the API management functionalities on the home-grown cloud setup located outside European region.
9	Case company is strong in offering IT solutions to the customers from mining and minerals sector	Solutions are still traditional and not catering to the digital data assets utilization needs of the customers.
10	“API First” policy is included in the enterprise architecture strategy independent of specific industry or sectors.	Models and capabilities not available to implement the “API first” policy in the solution offering to the customers.
11	Business models exists to provide end to end IT solutions to the customers in the mining and minerals sector	Existing business models are still traditional towards offering IT solutions in a vendor-customer relationship manner.
12	Identified customer from the mining and minerals sector has an existing relationship with the case company and is happy with service.	The identified customer is willing to collaborate with the case company and some work is required to be done in the case company to answer this need.

As seen above from Table 3, while the case company is a competent and a credible player in the operation of traditional IT businesses, possessed good OLA and SLA’s with

internal departments and its peers, the modern ways of doing businesses are still in an exploratory phase.

Summing up, the results of the current state analysis pointed out that the case company continues to transform itself into a leading digital partner of choice derived from the parent company's strategy while still busy continuing to offer traditional IT solutions to the current customers. On the other hand, while, the mining and minerals customer is aggressively seeking solutions to collaborate and capture value from own digitalized data assets believes that the case company can offer modern solutions such as API platform-based solutions to address it's need whereas, the case company has a challenge in terms of change management and availability of modern business models such as API platform business model and capabilities to deliver API platform-based solutions to the mining and minerals sector and hence, seeking development solution proposals to implement API platform business model.

3.4 Analysis of Digia Plc., identified Market Competitor

Digia Plc is a Software and service company based out of Finland. The thesis researcher chose Digia Plc. because of the knowledge from earlier co-operations in the fields of integrations, wherein it was understood that providing integration solutions to customers is the core competency of Digia Plc. It is also a known and leading peer competitor of the case company, both providing integration solutions to the Nordics market.

When conducting further research on Digia Plc. using web-based search tools such as www.google.com, it was gathered that Digia Plc. has grown up the value chain in the integration areas and is offering API centric solutions to its customers, a logical progression from providing traditional integration solutions. Considering the reasons stated above, it was of interest for the thesis researcher to understand and analyze the API Platform business capabilities offered by Digia Plc. As It is one of the main competitors to the case company and hence will safeguard its internal knowledge and intelligence in order to keep itself ahead in the competition therefore, the analysis was conducted based on the available information from its website. For the topic of this thesis, the Integrations and API capabilities of Digia Plc. from the Value from Data services layer of digitalization were analyzed. First, relevant information was gathered from its website www.digia.com. The gathered information was then synthesized and analyzed to

understand how and why it entered into the API business market, its API business propositions portfolio and draw a conclusion based on the analysis.

According to Digia website www.digia.com, it is listed on NASDAQ Helsinki stock exchange with operations in Finland, Sweden while operating in Denmark, Netherlands through subsidiaries. At the end of 2021, the net sales of Digia Plc. stood at 155.9 Million Euros with strength of 1339 employees. It operates extensively in a broad range of very different markets by having systematically built customer and independent offerings and positioned itself as end to end digitalization partner to the organization. Digia provides project business as well as comprehensive services for maintenance, monitoring and improvement developments. While the project business caters to markets transformative needs, the service business brings stability to Digia's business at the same time serving as a foundation for long term value partnership with customers. Digia's Key strengths translating into business successes for the company are derived from the digitalization, more business-driven IT investments, and the growing importance of the cloud services.

According to the available information on the website of Digia i.e. www.digia.com available in the public domain following information on "API Centric" solutions have been identified as listed below in Table 4.

Table 4. Solutions offering from Digia Plc. for Digitalization Layers.

	Topic	**Solution**
1	Customer understanding and business benefits	Service Design and Business consulting services.
2	Efficient and data driven services	E-commerce, Mobile services, Online services, Low-Code.
3	Value from Data	Data and analytics, Internet of things, Integration and API.
4	Business systems supporting everyday processes	ERP, CRM, Financial systems, Digia logistics.
5	Maintenance, continuous development and security 24/7	Monitoring and service management, Cloud platforms, High-security solutions.

As seen above from Table 4, it can be understood that Digia Plc. has a full stack solutions capability in not only the traditional offerings but also in the modern API based offerings.

Integrations has been the core competency of Digia Oy delivering business enabling integrations to the customers in Finland. Circa 2016, Digia Oy established a growth strategy plan to grow up the value chain by way of acquisitions and developing future proof systematic and customer independent solutions. The objective was to allow Digia to remain consistent value creator in the digital space.

The API services offered by Digia covers the development of API function and architecture, development of APIs and APIs management. Digia has systematically developed a collection of tools and methods known as the APIOps Cycles™. This collection was developed with an aim to design API management compatible APIs with clear business instead of technical orientation and best practices architecture patterns as listed below in Table 5.

Table 5. Digia Plc. API Business proposition.

No	**Solution framework**	**Description**
1.	APIOps Cycles (API Canvas, API Audit)	Used to ensure that APIs have strong business case and help keeping the developer community engaged.
2.	Deep as well as wide Integration competencies	Digia has a comprehensive service package for managing and developing customer organization’s integrations. Digia’s Integration Competency center (ICC) is at core of these services. The ICC has both wide set of competencies spanning from legacy integrations technologies to more modern API and architectural planning skills, systematically developed. Moreover, it operates closely with customer offering de-centralized integrations developments and delivery in different parts of customer’s organization all the while retaining the consistent practices in line with the architecture due to centricity nature of the ICC.
3	Technology Openness	Wide spread of integration and API Technology off the shelf products such as IBM, Dell Boomi, Apigee from different vendors forms the part of Digia’s Integrations consulting and implementation capabilities.
4	Data security	The Security and Data privacy capabilities are default by design included in the API services.

5	Run Anytime, Run Anywhere	Capabilities include Implementations of “API Centric” Solutions to on-premise environments and possible scaling through cloud and hybrid IT environments.
6	E2E Lifecycle services for whole	All services from planning to implementation to maintenance and monitoring 24/7 model. Service integration and management available.
7	Realization of API Economy	Services to build customers’ API economy by opening data assets for business use through APIs.

As seen above from Table 5, it can be understood that Digia Plc. looks to be a strong IT services and technology-oriented provider of API based integration services. They have systematically developed full service offerings on almost all levels of digitalization through APIs. Moreover, from the gathered information, it looks like Digia Plc. has strategically avoided to become an active player or stakeholder in the API ecosystem and continue providing API integrations consulting and run services solutions to customers. By utilizing Digia Plc. capabilities and developed competencies, customer is able to plan and implement transformation of its own business model to “API Centric” platform business model. However, Digia Plc. does not seem to possess own “API Centric” platform business model to offer business services to partners within any particular industry vertical and continue to fulfill their objective of industry and customer independent service provider for API based solutions.

Summing up, Digia Plc. has developed and matured technical competencies, tools and methodology framework of delivering of API based solutions, independent to any particular industry vertical or customer. This setup enables customers of Digia Plc. to develop own API Platform business models embedding the offered solutions from Digia Plc. Offered standardized tools such as APIOps cycles for business case justifications and auditing purpose are templatized and can be used by customers to quickly develop and scale up own industry specific API based solutions. In this partnership, while the customer retains the ownership of own data assets and API platform assets, Digia Plc. manages and maintain the hosted API Lifecycle from business case, development to retirement.

3.5 Analysis of the API platform needs of the identified customer

The analysis of the needs of identified customer was conducted with a Finnish headquartered organization providing services and technologies in the mining and minerals refining and processing industry. As is the case elsewhere, the identified customer wants to identify itself as a one of the digital key players within the API economy of mining and minerals refining and processing industry. Recently, it has embarked on a seven-layer digital transformative journey. Additionally, as business strategy, the prospective customer has outsourced its own warehouses and operations to third party warehousing solutions providers to benefit from the operator's expertise while itself focusing on the core business of providing first line solutions to the mining and minerals industry. To make this operating model functioning seamlessly and participate in the API economy of mining and minerals industry, the identified customer is exploring possible API platform solutions with competent vendor partners. The case company has an existing co-operation with the identified customer by means of providing traditional IT consulting, maintenance and staff augmentation services. The current framework agreement is under negotiation to consider collaboration in the digital space through API platform services.

The identified customer case is a global organization and the country organizations are following the global strategy and deploying same architecture at the regional and local levels with the exception of local and legal requirements. According to the provided inputs, there was little understanding of the API economy around 4-5 years back and the management focus was more on conventional business models with no use case or justifiable business case for the API economy being taken seriously. API's then were limited in the technical domain and acted more as point to point technical enablers between two interacting systems. Very little thought was given to competencies development in the strategy due to lack of clarity. Presently, fair amount of API readiness is there with management sponsorship and, competencies have been identified.

> *"We have a huge installed base knowledge gathered out of many decades of installations of our machines at customer sites. The leadership thinks now is the right time to start co-creating saleable products around it. In order to do that, as a strategic shift we have introduced an "API first" policy in the global architectural guidance"* (Enterprise architect, identified customer).

It was also noted that standardization of IT systems and data at global level allows the identified customer in attracting more business in the domestic and global market(s). Moreover, the limited local IT staff is addressing only the operational IT needs and as such most of the traditional IT developments are done by sourcing staff from partners such as the thesis case company.

> *"We have in-herited a legacy of disconnected systems of records and master datas due to our in-organic growth" (*Enterprise architecture, identified customer).

> "*We know our role and the importance of our digital installed base data within the API economy*" - (Enterprise architecture, identified customer).

During the interview with the informants, it was revealed that data accuracy and upkeep remains a potential bottleneck in realizing the digitalization benefits of safely sharing the organizations rich installed base knowledge with the outside community. The informant mentioned that for organization to implement API first policy effectively, underlying data needs to be harmonized and accurate. Furthermore, it was also mentioned that data inaccuracy results in wasting many productive hours in investigating and fixing across different department.

The identified customer has initiated data re-structuring, harmonization and digitization of data assets from non-digital format, over operating countries. While harmonization will be a crucial milestone in unlocking the value of installed base, the digitization of data assets will enable sharing of data, digitally within the API economy.

According to the provided insights, the inference is that information security and Data privacy has different meaning for different stakeholders.

> *"We use OAuth 2.0 as the industry standard protocol for access authentication"* (IT Security Manager, Potential customer).

Within API economy, there is a pressing need to create a common definition of information security and data privacy. More important is the successful implementation and keeping it current so as to keep the involved parties in the API economy safe and secured. The recent GDPR implementation has thrown some challenges in clear

definitions of the roles and responsibilities of the data processors and controllers in the API economy. Installed base data monetization is one key identified business objective hence it is imperative that it will be needed to be shared with multiple parties. Identification and keeping such access record will be a monumental task in the API economy.

> *“GDPR Compliance is where we are struggling and that is also outside the domain of IT security team”* – (IT Security Manager, Potential customer).

Similarly, data accesses should be limited so as to avoid mass scale breach of confidential competitor and or personnel data.

3.5.1 Customer Needs from the case company

The identified customer is seeking collaboration with the case company to co-produce API economy solutions in the mining and minerals industry. The expectation is that the case company will act as a technology partner, offering and be responsible for necessary technical expertise, API platform setups, licensing and selling of hosted services on the API platform. Besides also the technology partner will be responsible for the lifecycle management of all hosted APIs and the API platform. Furthermore, identified customer is looking forward to explore various cost model associations with the partners of the API economy. During the interviews conducted with the concept owner, Standard products and parts, it was noted that two cost models were generating quite an interest in the prospective customer’s initiative ownership community namely, transaction volume-based costing and investments & risk sharing model. The identified customer indicated that it is looking forward to collaborate with its partners along those lines.

3.5.2 Other considerations

It was understood during the interviews that the identified customer has implemented SAFe® (Scaled Agile framework) way of doing projects. Moreover, the identified customer has minimum local staff in IT with very little bandwidth to deliver new projects or initiatives on any of the digitalization layer.

While delivering the solutions in the API economy, it is expected that each partner understands its own roles and responsibilities. However, when developing API Platform services, it was expected that the developments should be based on open, standardized model and not for one but many consumers or customers. It was gathered that the identified customer is of the view that case company mostly delivers on time and has ability to scale and provide competent consultants. It was also gathered that the account management structure of the case company is proactive and committed to deliver contractually agreed services.

> *“We are satisfied with the quality of IT consulting services in the integrations field provided to us.”* (Manager Application Integrations, identified customer).

Summing up, based on the results from the interviews, it can be concluded that the identified customer is well aware and clear on its role in the API platform business model i.e. a key supplier of owned digital and harmonized installed base data assets to co-create and capture value. Furthermore, it is does not expect the case company to generate any data assets instead the expectation is that the case company will play another key focal role, within the API economy, by means of providing necessary API Platform setup and technical services to allow seamless sharing of the installed base data assets over a wider demand side partner base. In this partnership, the identified customer will retain the data assets ownership, the case company will own the API Platform assets and services and be responsible for selling activities of the platform. Furthermore, the identified customer based on the so far collaboration with the case company, believes that the case company will be able to deliver and manage collaborative solutions with itself within the API economy space.

3.6 Key Findings from the current state analysis

This section lists and describe the key findings collected from the current state analysis phase:

3.6.1 Culture

The results revealed that there is enough awareness about the API platform economy in the case company and the benefits it brings to the collaborating partners. Morever,

cultural changes have been introduced through change management though those are in general challenging. Effective communication is one key identified risk.

> *"Our leadership has initiated an internal transformation program to change the way of delivering our services to the end customers. Communication plans have been put in place and multiple internal projects have been initiated to as a part of the internal transformation program. In the end we want to become digital partner of choice."* (Enterprise architect, case company).

Whereas, on the customer side cultural changes have been already put in place by means of changing the ways of project deliveries by using agile methodologies such as SAFe® (Scaled Agile framework) and sensitizing the customer staff about importance of proper handling of the installed base data.

3.6.2 Business models and tools

The result of the conducted interviews revealed that there is a need to develop business models for modern ways of conducting businesses such as API Platform based businesses in the mining and minerals sector. The available business models still catered to traditional ways of doing businesses by taking a vendor-customer relationship approach. This presented a risk to the existing relationship by means of customer seeking better alternatives to incumbent vendor thereby resulting in losing the contract.

> *"My customer is modernizing their ways of working by undertaking digital transformation initiatives at various layers, they expect us to lead them in this journey. I know what API economy is, and given our good collaboration, can offer customer to on board with us in co-creation but I require some models and tools to convince the customer."* (Account Manager, customer of the case company).

> *"It is unfortunate that our customers from the mining and minerals sector are aggressively transforming themselves into API economy players, meanwhile we continue to offer traditional capabilities-based solutions to them."* (Domain architect, mining and minerals sector, case company).

3.6.3 Strategy and capabilities

The investigation pointed out that the case company strategy includes the necessary elements with an objective to become digital transformation partner of choice. Evolution is underway to include key modern elements such as" Agile delivery and Devops culture"," API First"," Data model" etc. However, the architectural framework is, at the moment, matured only for the traditional ways of doing businesses.

> *"Offering our own cloud setup as an alternative to Azure and AWS for the API Platform economy is the directive we received from our parent company. But on ground situation is very different. We do not yet have necessary capabilities developed specific to the Nordics market or the mining or minerals sector, in particular."* (Enterprise Architect, case company).

While "API First" policy is included in the enterprise strategy of the case company, the enterprise strategy and the supporting structure on the customer side is very much in place to address the API economy needs.

3.6.4 Technology, Processes and Scaling ability

Again, the investigation gave an understanding that the technology and processes are now matured and aligned for delivering the results. The scaling ability is also there given the partnership with global scale cloud partners and existence of global delivery centers. However, models, tools, capabilities and competent resourcing are the identified bottlenecks in the case company.

3.6.5 Data

Data cleaning and harmonization across operational countries is progressing and remains a bottleneck to digitalization transformation both on the case company and the customer side.

> *"The case company should provide the necessary technical setup to allow us to monetize our installed base data."* (Enterprise architect, identified customer).

Within the API Platform economy, the case company is not expected to generate any own data assets rather the identified customer will own and provide the necessary digitalized installed base data assets.

3.6.6 Information Security and Data privacy

The case company has implemented Enterprise level information security and data privacy policies and procedures to safeguard own IT and data intensive operations. Those policies and procedures are to be mandatorily complied when operating in the case company's environment and wherever applicable, are used in providing secured solutions to the customers of the case company.

> *"GDPR Compliance is where we are struggling and that is also outside the domain of IT security team".* (IT Security Manager, identified customer)

With GDPR implementations and other frameworks of security in place, the Information security and Data privacy is well covered. However, GDPR is presenting own challenges of data management and accesses with segregation of the duties of data owners and identification of cases of non-compliance to GDPR regulations and reporting mechanisms are identified to be main challenges.

3.7 Summary of the Current State Analysis Results

This section summarizes the results of the current state analysis pointing to the main strengths and weaknesses identified in the available business models available within the case company

In order to summarize the results of the current state analysis, an explanation on gained assessment of the strength and weaknesses is presented logically. Based on the identified weaknesses, the selected focus areas are then listed. The selected focus areas guide in establishing the themes for the literature review as well as identification of the main elements of the solution proposal of this study.

3.7.1 Strengths and Weaknesses

The current state analysis resulted in identification of the following strengths:

First, the case company wants to become a leading digital transformation partner for its Nordic customers. This aim is being also supported by initiations of internal transformation and exploration of modern business model such as API platform business model, inclusion of necessary elements such as “API First” policy in the enterprise architecture strategy and exploring modern business models. Sufficient knowledge levels are there within the case company about API economy and its benefits to own and the collaborating partners. The leadership is also showing support by allocating considerable budget for development of own cloud setup and API management functionalities and initiating projects to change the culture and ways of working of the case company. Furthermore, scaling is possible due to case company’s global presence was identified as a key strength while conducting the current state analysis on the case company. This is a foundation element of any API platform business. Reason being that the very purpose why the API Platforms have delivered value in the API economy is the inherent ability to get scaled up at demand.

Second, the case company has a global level and strong platinum level partnership with Azure and AWS, leading cloud hosting setup providers in the API economy. Functioning of their business models and cloud solutions use cases have been validated in many Fortune 500 companies. Furthermore, the cloud solutions can be upscaled or downscaled on demand, a foundational capability needed for productively contributing in an API economy. The case company can quickly leverage on the inherent strengths and capabilities offered by these cloud partners and rapidly develop own API platform business model and capabilities. Additionally, the case company has own functioning cloud setup, which is home-grown. Hence, it can offer three cloud options to its customer for hosting API platform namely : Azure, AWS and own home-grown cloud setup. Many competitors in the Nordic market can only offer two i.e. either Azure based or AWS based solutions to the API platform economy.

Third, another strength observed was that there is a good understanding of the API platform economy and its benefit to the case company. The case company is fostering and further developing this understanding by effectively engaging in various communication channels such as workshops, webinars, publishing on intranet, FAQ’s

and reaching out one on one to the key stakeholders. This, in the thesis researcher's opinion, is one foundational key element as it has been observed that most of the internal transformation and change management projects fails when there is lack of understanding on the ground about the initiatives being undertaken by the company.

Fourth, the identified customer has an existing good partnership with the case company for providing solutions, maintenance, project and service management in its traditional IT Landscape and considers the case company to be a strong collaborative partner being able to react fast to its changing needs. The identified customer has initiated own internal digital transformation as a result is in the process of digitalizing the installed base data and keeping it in a ready state. Hence, it is willing to get onboarded quickly with the case company in a collaborative partnership, a key requirement of the API economy.

While above descriptions covered the strengths from API platform business model perspective, there were some weaknesses also identified as explained below:

First, while business models do exist within the case company, those are mostly traditional ones catering to the “bread and butter” of the case company. It was revealed that there is either limited or no availability of flexible, simple or scalable models and tools, within the case company, to deliver solutions for the API platform business and devops services, for example. If not addressed quickly, this weakness may have a strong impact on managing customer expectations and capitalizing on opportunities being offered in the API economy space.

Second, based on the provided inputs, the case company does offer API solutions along with API management functionality but, those are available only on own grown cloud setup, focused on enabling integration between apps and the offered API management functionality is limited in nature. The whole setup is located outside European area. Moreover, it is understood that the industry specific API platform-based solutions such as for minings and minerals sector, for example, does not exist at present on the offered cloud hosting setups such as Azure and AWS.

Third, dominating involvement of technical R&D department in the development of API led initiatives and limited involvement of business line organizations have had an influence on the implementation approach of the “API Centric” solutions. It was observed that the APIs, which otherwise are considered as a product with various features and

having own product lifecycle management to allow productive usage within the API economy, are developed or being developed with limited purpose of acting as technical integration enablers in the developed or being developed “API centric” solutions within the case company.

Fourth, it is observed from the results that while the case company has initiated an internal transformation to achieve the strategic objectives of wanting become a leading digital market player within which, becoming a strong API economy partner is one key elements. However, the way of doing and servicing business is still traditional in nature as highlighted in the first point. Valid reasons being that the many customers of the case company have recently or are in the process of renewing the existing contracts for traditional IT solutions and services. And these activities are consuming the available day job time of the most of the staff from sales, account and technical line organization. So, there is very limited time left to take a look, design, implement the modern business models such as API platform business models and develop the ecosystem capabilities. Also, the results of competitive analysis pointed out that the competitors of the case company, by virtue of either being nimble or past in-time strategic re-focusing have implemented modern API business models are delivering API economy solutions at a quicker pace to the partners thereby strengthening the relationship and moving up the value chain. Overall, this was identified as a threat to the position of the case company within the API economy. Table 6 below summarizes the key identified strength and weaknesses of the current API business by the case company.

Table 6. Summary of strength and weaknesses results.

	Strength	**Weakness**
1	Well-functioning business models for traditional IT Solutions and services.	Models not available for API platform business economy.
2	Has strong partnership with cloud solution companies such as Azure, AWS to provide cloud hosted solutions, offer own home-grown cloud setup.	Cloud hosted API platform-based solutions not available for the mining and minerals sector.
3	Understands what is API economy and why it is important for own and customers.	“API Centric” solutions are still technical and development driven in nature.
4	Existing partnership with identified customer. Customer believes that the case company will provide API platform-based solutions to address it need in the digital space.	Case company requires API economy capabilities development and needs modern business model to be put in place.

3.7.2 Selected Focus Areas

Based on the identified weakness(es) i.e. lacking of modern models for API platform business economy in the case company, lacking of cloud hosted API platform-based solutions for the mining and minerals sector and lacking of API economy capabilities, the following focus areas were selected for the next steps, as shown below in Table 7.

Table 7. Selected focus areas for the solution proposal for solving the business challenge.

	Selected focus areas
1.	Acquiring knowledge about API economy
2.	Focusing on Purpose driven platforms
3.	Developing an API business model

For the selected focus areas, as shown above in Table 7, there is a need to conduct a literature and industry best practice search in-order to explore the available knowledge for building the solution proposal.

Next, in Chapter 4, the study focuses on exploring the available knowledge on the selected focus areas in order to identify relevant knowledge elements and build a conceptual framework (guidance) for developing the proposal.

4 Existing Knowledge and Best Practice on API Platform Business Models

This chapter discusses best practices, literature, knowledge and key concepts related to selected focus areas on API economy, purpose driven platforms and API business models. First, a brief understanding of API economy is discussed. Second, key elements such as key role of APIs, APIs management, applicable best practices are discussed. Third, prevailing definitions of the business model are briefed followed by discussions on the popular canvasses of business modelling such as Business model canvas(by Osterwalder and Pignuer, 2010), Service logic business model canvas (by Ojasalo and Ojasalo, 2015). There is also a discussion on the various types of API business models being utilized by "API centric" organizations to conduct businesses and API model canvas (by nordicapis.com, Moilanen, 2016). Fourth and finally, a conceptual framework constructed by merging elements from the available literature is presented.

4.1 API Economy

This section briefly describes an API economy and the reasoning for enterprises to embrace the API economy.

"The API Economy is not just a catch phrase, it is key to accelerating value, improving business performance, and extending your business services and goods to the widest possible audience" (Holley et al., 2014, 1). Moreover, *"This is the API Economy, the business of APIs"* (Doerrfeld, 2016).

According to Holley et al. (2014, 4), enterprises need to embrace the API economy and they justify this need by providing reasons, as summarized in Table 9 below.

Table 8. Reasons for embracing the API economy (Holley et al. 2014).

	Reasons for embracing the API economy
1	Make adoptions of their value propositions very simple, using APIs to ensure that they are easy to do business with and enabling open platforms allowing others to innovate.
2	Grow your customer base by attracting customers to your products and services through API ecosystems.

3	Use API ecosystems to extend your business capabilities and products to the widest possible audience.
4	Drive innovation by capitalizing on the composition of different APIs, yours and third parties.
5	New business opportunities can be created from APIs and business benefits can be derived from open innovations of crowd sourcing and expert sourcing unlocked by using APIs.
6	Improve the time-to-value and time-to-market for new products. (Holley et al., 2014, 4.)

While reasoning, Holley et al. (2014, 4) cite examples of successful pure play platform companies such as Facebook, Amazon, salesforce.com as evidences in-order to motivate enterprises to embrace the API economy.

For those enterprises looking forward to embrace the API economy, Jacobson et al. (2011) highlights that APIs are becoming a de facto conduit for participation in API economy, and cites examples of popular consumer and business services like Twitter, Google, Netflix using APIs to successfully participate in API economy. Jacobson et al. (2011) then advises the enterprises embracing the API economy to start considering APIs from a strategic level perspective and define a business strategy around them. In order to guide such enterprises, Jacobson et al. (2011) further advises to define and understand the API value chain as shown in Figure 2 below.

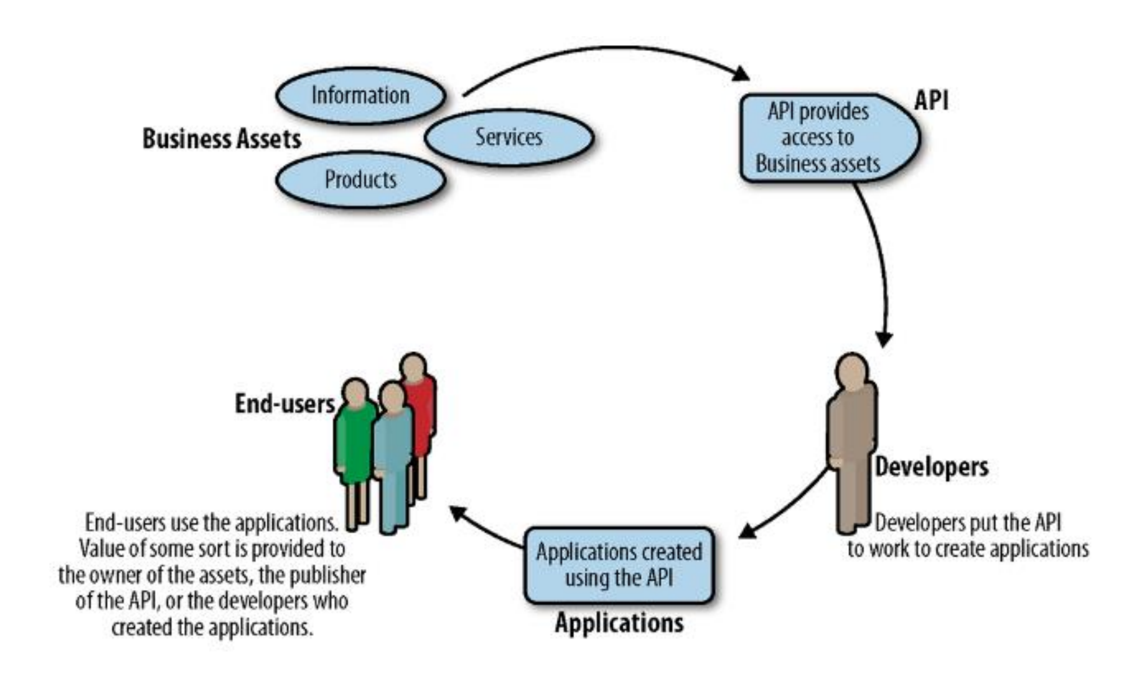


Figure 2. API Value chain (by Jacobson et al., 2011).

As shown above in Figure 2, according to Jacobson et al. (2011), the value chain starts with the identification of those business assets, which, enterprises participating to the API economy are willing to safely share with their partners. Jacobson et al. (2011) emphasizes further that it is important for the identified shared business assets to be of value and to be of eventual benefit to the owner of the business assets, in order to successfully participate in the API economy.

Once an enterprise has identified the business assets to be shared, next step is to create APIs to safely expose those business assets (Jacobson et al., 2011). The created APIs then can be published (Jacobson et al., 2011) to participate in the API economy and generate value of some sort for the owner of the business assets, the publisher of APIs, or the developer who created the apps based on the published APIs (Jacobson et al., 2011.)

The next section discusses the key role of APIs within an API Economy.

4.1.1 Key role of APIs for successful participation in the API economy

While emphasizing on key role being played by APIs for successful participation in an API economy, business practitioners say that, *“APIs are at the basis of platforms business models on which ecosystems are built”* (Malinverno, 2017, cited from: Pettey, 2017).

Brajesh De (2017) defines API as follows : “*An API is a software-to-software interface that defines the contract for applications to talk to each other over a network without user interaction*” (De, 2017). While, Gough et al. (2022) takes an abstract view and defines API as follows : *“An API represents an abstraction of the underlying implementation”* (Gough et al., 2022). Whereas, Holley et al. (2014, 6) takes a business view and defines APIs as follows: “*APIs being business products, which when designed carefully are easily consumed by a device or system whether that is a website, car, home appliance, or wearable*” (Holley et al., 2014, 6).

According to Pettey (2017), API framework acts as an enabler to realize the objectives of other layers of digital transformation such as Analytics, Robotics process automation (RPA). In other words, Pettey (2017) emphasizes that API framework is the single most important key element of a successful digital transformation strategy by quoting that “APIs are the basis of every digital strategy.” (Pettey, 2017). In-order to justify about the important role being played by APIs in successful realization of the digital transformation, Pettey (2017) reasons as follows : “APIs make digital society and digital business work by connecting people, businesses and things. Those connections enable new digital products and business models and create new business channels” (Pettey, 2017.)

According to Berlind (2018), “organizations around the world that directly or indirectly monetize their APIs form the basis of what the media often calls the “API Economy.” Berlind (2018), further mentions that enterprises are conducting trillions of dollars of value on an annual basis through the API economy. In order to bring it to the notice of business practitioners, Wendell (2019) released a plotted graph on growth of the API directory being maintained by www.programmableweb.com over time as shown in Figure 3 below.

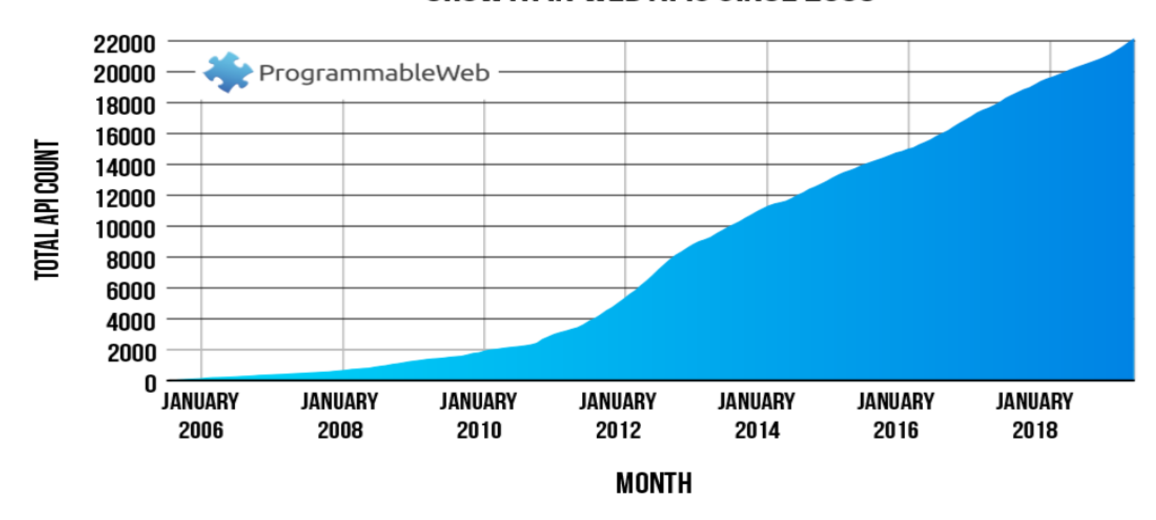


Figure 3. The growth over time of Programmable web API directory (Wendell, 2019).

As can be seen above in Figure 3, according to Wendell (2019) there has been an exponential growth in the new APIs being added year on year since 2010 onwards. It can also be seen from the Figure 3 that as of 2019, 22000 APIs are listed in the API directory maintained by www.programmableweb.com (Wendell, 2019). Wendell (2019) further takes a timeline evolution perspective and explains the Figure 3 as follows : “Circa 2005, the APIs were limited to one of the many possible ways of allowing two disparate applications to talk to each other. APIs implementation around 2005 resulted in point to point tightly coupled applications with ever increasing complex maintenance overheads and diminishing value returns. Around 2010, it started to become a trend due to businesses and enterprises having gain an insight in the benefits of sharing enterprise assets and multiplying the value effect by taking APIs out of the limited domain of point to point connectivity between enterprise apps. Whereas now, the APIs has become core to many businesses” (Wendell, 2019.) Wendell (2019), then presents statistics of average APIs being added on an annual basis since 2015 to the API directory maintained by www.programmableweb.com as shown in Table 9 below.

Table 9. Average APIs added per year (by Wendel, 2019).

Total new APIs added since 2015	8,076
Average new APIs added yearly	2,019
Average new APIs added monthly	168

As can be seen from Table 9 above, according to Wendell (2019), “8076 APIs since the year 2015 have been added whereas at present, on an average 2000 APIs are being added monthly and 168 APIs are being added weekly” to the API directory maintained by www.programmableweb.com. Guided by these figures, Wendell (2019) then concludes that the API economy is not only striving but is also growing at a faster pace than ever.

Before publishing above mentioned statistics, he presented a sector wise or categorization of the usage of APIs in the year 2018, as shown in Figure 4 below.

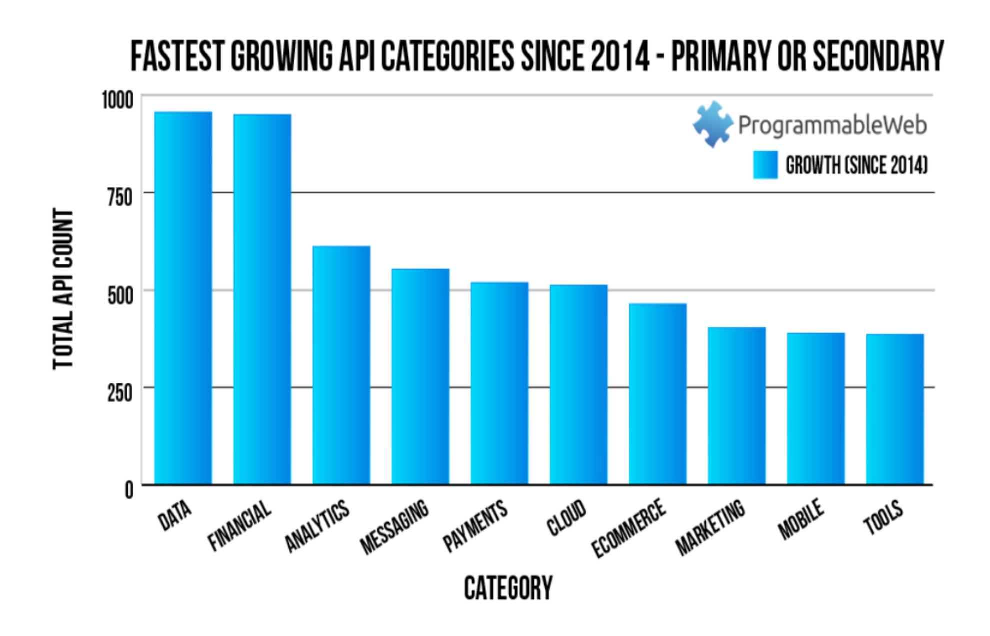


Figure 4. Fastest growing API Categories since 2014 (Wendell, 2018).

As shown in Figure 4, according to Wendell (2018), data and financial APIs lead the way followed by analytics. Wendell (2018) further points out that the other categories such as messaging, cloud and ecommerce and enterprise APIs are growing consistently followed by marketing, mobile and tools APIs. The reasoning provided by him for the last three categories having slower growth as compared to the others, “could be attributed to the fact that these categories seems to have matured and standardized through multiple phases of transformation.” (Wendell, 2018.)

The next sub-section discusses the best prevailing practices within an API Economy.

4.1.2 Management of APIs using API management platform

According to De (2017), API management is the set of people, processes and technology that enables an organization to safely and securely publish APIs, either internally or externally. De (2017) further states that once necessary APIs have been created, those needs to be managed using an API management platform. De (2017) defines the API management platform as follow : “An API management platform helps an organization to publish APIs to internal, partners, and external developers to unlock the unique potential of their assets” (De, 2017.) De (2017) further illustrates this definition as shown in Figure 5 below.

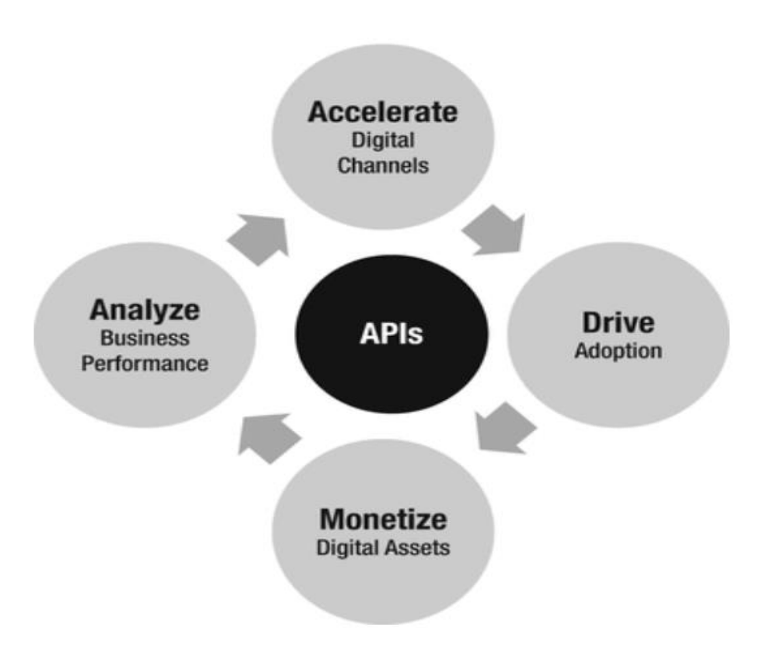


Figure 5. API management offerings (Brajesh De 2017).

As shown in Figure 5, according to De (2017), any organization wanting to effectively participate in the API economy should develop above shown capabilities and processes by means of an API management platform. He further describes the facilitation role being played by API management as follows: “The API management platform should help in developer enablement for APIs, allow secure, reliable and flexible communications, should be capable of full API lifecycle management and allow API auditing, logging and analytics” (De, 2017.)

The next sub-section discusses on the best practices of an API economy.

4.1.3 Best practices of an API Economy

According to Vukovic et al. (2016), “the guiding principle of API Economy is that acquired shareable assets of an enterprise generate value at their best when shared safely outside enterprise”. “Applying API economy best practices may lead to successful implementation and business models” (Vukovic et al., 2016.) Furthermore, Vukovic et. al. (2016) considers that the API economy has matured over the years to get to a state where each party has a defined well-functioning role to play. In a recently published Gartner journal, Pettey (2017) proposed that any business and or developer partners desirable of playing a defined role and to safely onboard in an API economy, should aim to adhere to at least the best practices as summarized in Table 10 below.

Table 10. Best practices to safely onboard in an API economy (by Pettey, 2017).

	Best practices to safely onboard in an API economy
1	APIs should be included to boost digital strategy (Pettey, 2017).
2	Overall digital strategy should drive the API program (Pettey, 2017).
3	API monetization should be planned and it can be more than just charging calls, and could be based on the business value it brings to a developer/consumer (Pettey, 2017).
4	APIs should be considered as enablers of bimodal operation (agile and experimental) (Pettey, 2017).
5	Plan your cyber security as APIs are the door to your data and applications (Pettey, 2017).
6	Focus on planning and building business APIs that deliver value instead of own API platform development (Pettey, 2017).
7	Your internal architecture should also rely on API architecture and integration (Pettey, 2017.)

Looking from a big picture perspective (Osmaks, 2017) working at IBM, an enterprise and a market leader in the API economies and API led transformations, proposes a collection of steps for successful onboarding to an API economy as shown in Table 11 below.

Table 11. Steps for successful onboarding to the API economy (Osmaks, 2017).

	Steps for successful onboarding to the API economy
1	Create your strategy (Osmaks, 2017).

2	Build and manage world class applications (Osmaks, 2017).
3	Secure and integrate across open ecosystems (Osmaks, 2017).
4	Scale expertise (Osmaks, 2017).
5	Monetize (Osmaks, 2017).
6	Scale expertise (Osmaks, 2017).
7	Deliver exceptional services . (Osmaks, 2017.)

Taking a combined look at the proposals presented by Pettey (2017) and Osmaks (2017), it becomes clear that they are proposing adherence to similar best practices principles to safely onboard to an API economy. Both, Pettey (2017) and Osmaks (2017) emphasize on inclusion of APIs in enterprise level strategies and being able to build a stable and safe API ecosystem by developing the sub areas such as API security, monetization and developer programs.

The next sub-section discusses on purpose driven platforms.

4.2 Purpose driven Platforms

This sub-section discusses on “Purpose driven platforms”.

“Many things are called platforms and what we are describing as purpose driven platforms are digital foundations (comprising products, services and technologies)” (Holley et al., 2014, 10). Moreover, “Platforms enable production and transactions. They facilitate sharing, exchange and co-development of services” (Holley et al., 2014, 10).

Pettey (2016) emphasizes on the key role being played by platforms in value creation by citing Moyer (2016) as follows: “Platforms multiply value creation because they enable business ecosystems inside and outside of the enterprise to consummate matches among users and facilitate the creation and/or exchange of goods, services and social currency so that all participants are able to capture value.” (Moyer, 2016, cited in: Pettey, 2016.)

Purpose driven platforms is one of the many themes emerging out of elastic enterprise concepts. Holley et al. (2014, 10) cite Nicolas Vitalari and Haydn Shaughnessy from their

publication “The Elastic Enterprise: The New Manifesto for Business Revolution”, while describing the challenges in exactly defining a platform. Nevertheless, they mention that Vitalari and Shaughnessy (2012) do list several characteristics or features that a platform should exhibit as summarized in Table 12 below.

Table 12. Features of a Platform (by Vitalari and Shaughnessy, 2012, cited in: Holley et al., 2014).

	Features of a Platform
1	They enable others to create or produce (by Vitalari and Shaughnessy, 2012, cited in: Holley et al., 2014).
2	They tend to be tightly coupled to the ecosystem (by Vitalari and Shaughnessy, 2012, cited in: Holley et al., 2014).
3	Many are about marketplaces (by Vitalari and Shaughnessy, 2012, cited in: Holley et al., 2014).
4	Platforms can be powerful constructs for internal reorganizations (by Vitalari and Shaughnessy, 2012, cited in: Holley et al., 2014.)

Holley et al. (2014) then provides examples of enterprises such as Apple, Google, Facebook and salesforce being pure play purpose driven platform business companies and lists common characteristics of the platforms of those enterprises, as shown in Table 13 below.

Table 13. Common characteristics of pure play purpose driven platform companies (by Holley et al., 2014, 11).

	Common characteristics of pure play purpose driven platform companies
1	Platform software development kit (SDK) for developers promoting the use of APIs for co-innovation or adoption of platform capabilities (Holley et al., 2014, 11).
2	Community capabilities that enable an ecosystem of partners and developers using partner and public APIs (Holley et al., 2014, 11).
3	Marketplace, where newly developed or co-developed services and apps by partners and developers can be offered and monetized (Holley et al., 2014, 11).
4	Multi-channel interaction patterns that enable creation and delivery of services and apps for different target devices, such as mobile or wearable, creating a customer experience that motivates and attracts (Holley et al., 2014, 11.)

According to Holley et al. (2014, 11), “Purpose driven platforms enable creation and growth of digital products for an enterprise without your company being the creator. Platforms allow thousands or millions of developers to build products (for example, Apple App Store), or thousands of partners (for example, Amazon.com). Platforms improve brand and add value for your clients and partners. A network effect occurs as more users, developers, or companies join”. Holley et al. (2014, 11) then concludes that “Platforms enable economic activity”.

Explaining further, Holley et al. (2014, 11) mentions that “the API Platforms represent an important new dimension of focus for companies”. The important role an API Platform plays in the emerging ways of doing businesses is further emphasized by Holley et al. (2014, 11) as follows : “API platforms allow companies to consistently deliver APIs as building blocks for customer, partners, or developers. This newly created, evolving, and diffused network of API enables creation of new capabilities and business models. It also results in newly created partnerships between providers and consumers”. (Holley et al., 2014, 11.)

According to Holley et al. (2014, 11), “platform promotes an ecosystem for businesses and, platforms rather than websites are becoming strategic control points to attract and retain customers and provide for an expanding business model making their companies continuously relevant and essential to their customers and partners”. To make it clear in the minds of the viewers on the importance of multi-faceted role being played by platforms, Holley et al. (2014, 11) provides a reasoning as follows: “Platforms not only enable marketplaces to connect buyers and sellers of the product and third-party developers to create products (APIs), but also they serve as knowledge brokers leveraging a deep understanding of individual customer needs. Increasingly, these insights about the consumption as well as the wanted capabilities are a differentiator and added value, allowing companies to provide increasing value or enhancing customer loyalty” (Holley et al., 2014, 11.)

Bendor-Samuel (2018), while discussing on the strategies to be applied for building digital platforms, highlights the risk of “Empty room” phenomenon while trying to build digital platform and presents further explanation, considering it to be a classic case of “chicken and egg” as follows: “The empty-room problem is very expensive to overcome. It’s the classic chicken-and-egg problem. You have the idea, you can see the idea potentially has merit, but you need multiple companies to collaborate with you to build

the product. If you don't have the product, they won't collaborate with you, and you can't build the product until they collaborate with you" (Bendor-Samuel, 2018). In this recently published Forbes arcticle by Bendor-Samuel (2021), he tried to manage the investment expectations of the enterprises building digital platforms by mentioning that assembling digital platforms is not "one and done." (Bendor-Samuel, 2021). According to Bendor-Samuel (2021), building digital platforms is a cost intensive iterative process. Highlighting the importance of commitment in building digital platform, Bendor-Samuel (2021) further states that "platforms require a commitment to ever-increasing spend on technology and ever-increasing spend on the people that support and implement that technology. Hence, the need for engineering talent rises dramatically" (Bendor-Samuel, 2021.)

Summing up, purpose driven platforms, as the name suggests, has a core purpose of particular business value being the core function of the platforms. "Purpose driven platforms enable creation and growth of digital products for an enterprise without your company being the real creator of those assets" (Holley et al., 2014, 11).

4.3 Business Models for API Platform Business

There are many definitions of business models in existence. Osterwalder and Pignuer (2005) defined the business model as follows:

"A business model is a conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specific firm. It is a description of the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating, marketing, and delivering this value and relationship capital, to generate profitable and sustainable revenue streams." (Osterwalder and Pignuer 2005.)

In the year 2010, Osterwalder and Pignuer (2010) further simplified this definition of business model as follows: *"A business model describes the rationale of how an organisation creates, delivers and captures value"* (Osterwalder and Pignuer, 2010). Moreover, *"to be useful, a business model framework must be reasonably simple, logical, measurable, comprehensive and operationally meaningful".* (Osterwalder and Pignuer, 2010.)

During late 1990's, business modelling as a concept started to gain popularity in the academic world. Emphasis was on trying to address the basic questions of what a business model is and its existence and the reasons of its existence. Osterwalder defines the role of a business model as follows: "*The role of a business model is to capture, visualize, understand and communicate the business logic"* (Osterwalder, 2004).

Whereas Heinonen et al. (2010) defines the business logic as follows: "*A business logic is a strategic mindset, or a mental model, of a company and its business activities"* (Heinonen et al., 2010).

Omar et al. (2013) took a digital ecosystem viewpoint to the business modelling. "*There needs to be a balance in an ecosystem between its members in order to allow value creation and conversion activities without any unnecessary competition."* (Omar et al., 2013.) According to Omar et al. (2013), "in the digital ecosystem business model value is created, converted and captured in different ways than in conventional business models" (Omar et al., 2013). A holistic view is taken by Omar et al. (2013), while describing the business model in context of digital space as shown below in Figure 6.

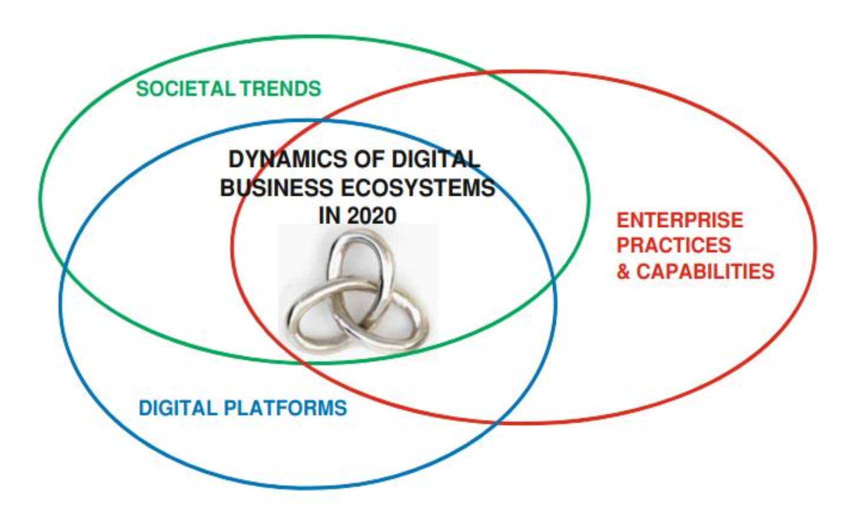


Figure 6. A holistic view of the dynamics of digital ecosystem (Omar, Sawy and Pereira 2013).

As Figure 6 shows above, Omar et al. (2013) provides an explanation as follows: "it captures the essence of interactions among three key elements of the digital business ecosystem namely: digital platforms, social trends and enterprise practices and

capabilities. The interactions are represented through the intersecting orbits in the Figure, but it also signals the fusion quality of digital business ecosystems through an entangled Gordian knot at the center. The digital business ecosystem has no separations among those three core elements, but it is the wholeness of the fused interactions among the three elements" (Omar et al., 2013.)

According to Omar et al. (2013), the definition and dynamics of value changes in the digital space as follows: "first, the whole notion of value changes in a digitally intensive world. Second, value is co-created, co-converted and co-captured together with different players in the ecosystem. Third, it is necessary to take into account the rapid shift in trends in digital platforms, societal values and enterprise practices and capabilities as they co-evolve" (Omar et al., 2013.) To describe the various actions happening on value in the digital business ecosystem i.e. co-creation, co-conversion and co-capturing, Omar et al. (2013) illustrated a value map as seen below in Figure 7.

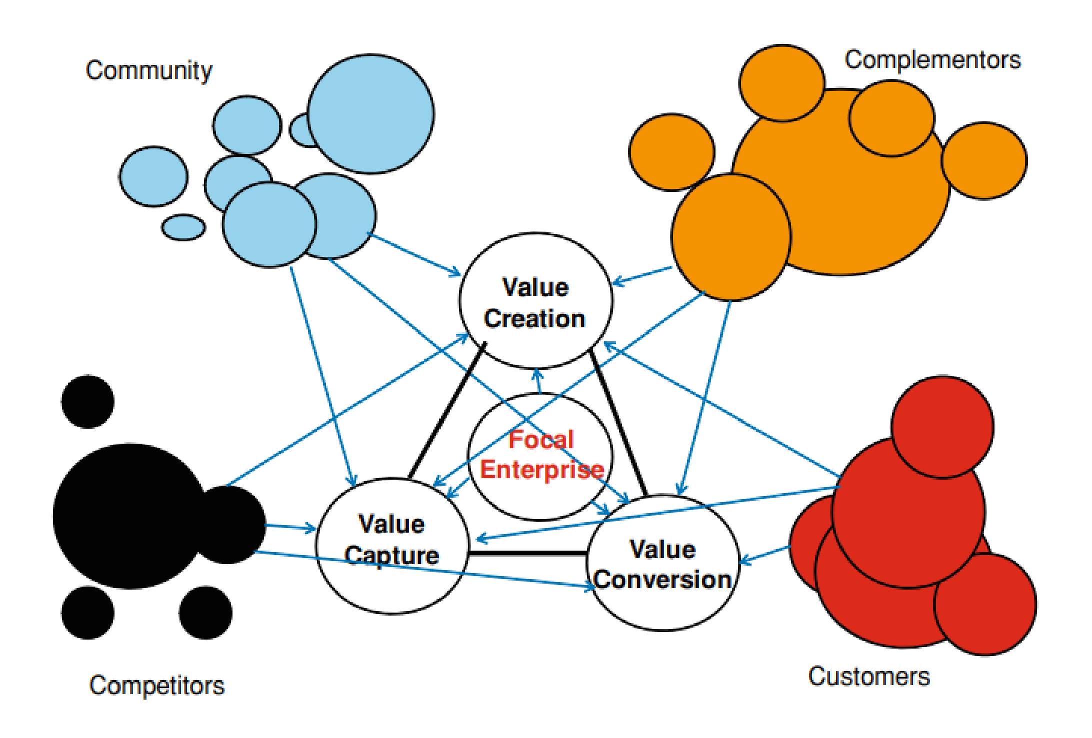


Figure 7. Value map of digital ecosystem (Omar, Shawy and Pereira 2013).

As shown Figure 7 above, Omar et al. (2013) highlight that the focal enterprise, while co-creating, co-capturing and co-converting the value, needs interactions of various intensity with its partners in the digital ecosystem. For example, the customers of the

focal enterprise have a dominating influence when dealing with value, followed by the complementors, competitors and community, in that sequence.

Omar et al. (2013) further cites Iansiti and Levien (2004) to explain the challenges in the balancing act being played by focal enterprises within such a digital business ecosystem as follows, “one of the key issues is the balance between value creation, value conversions, and value capture” (Iansiti and Levien, 2004, cited in: Omar et al., 2017). “Thus, enterprises in keystone positions in the ecosystem may choose to leave many activities of value creation to others in the ecosystem, while choosing to focus on creating value that is critical to the ecosystem’s prosperity. In digital business ecosystems, this may mean the creation of common digital platforms for the delivery of digital services whose value can be shared with the entire ecosystem, such that value conversion can take place” (Omar et al., 2013.)

According to Omar et al. (2013), “such balancing act becomes complicated resulting in the keystone position or focal enterprises losing focus of the intended purpose of developing a digital business ecosystem in the first place and re-focusing all efforts trying to maintain the balance instead of capturing value for its own benefit” (Omar et al., 2013.) However, the focal enterprise also needs to ensure that it can capture part of the value (Omar et al., 2013). Hence, Omar et al. (2013) recommend to design effective digital business models to ensure that the focal enterprises not only survive but continue to lead such an ecosystem towards prosperity. “It also means the design of effective digital business models for enterprise in such ecosystem conditions becomes more critical for survival and thriving.” (Omar et al., 2013.)

Summing up, Omar et al. (2013) defines a new and holistic perspective to the business modelling in digital space wherein more emphasis is laid on value co-creation, co-conversion and co-capturing. Omar et al. (2013) further mentions that one of the key responsibilities of focal enterprises is to ensure proper balance within the ecosystem and hence the recommendation is that such focal enterprise should design an effective business model for the modern business economy with purposes of not only surviving but also thrive and prosper (Omar et al.,2013.)

The remaining sub-sections of this chapter describes the possible business models canvasses from the available literature keeping in mind the value co-creation (Omar et al.,2013), co-conversion and co-capturing (Omar et al.,2013) and focal enterprise (Omar

et al.,2013) aspects, as explained above, to be referenced for constructing the conceptual framework of the study.

4.3.1 Business model canvas

According to Osterwalder and Pigneur (2010), the Business model canvas is a shared language for describing, visualizing, assessing; and changing business models. Their business model canvas consists of nine building blocks as shown below in Figure 8.

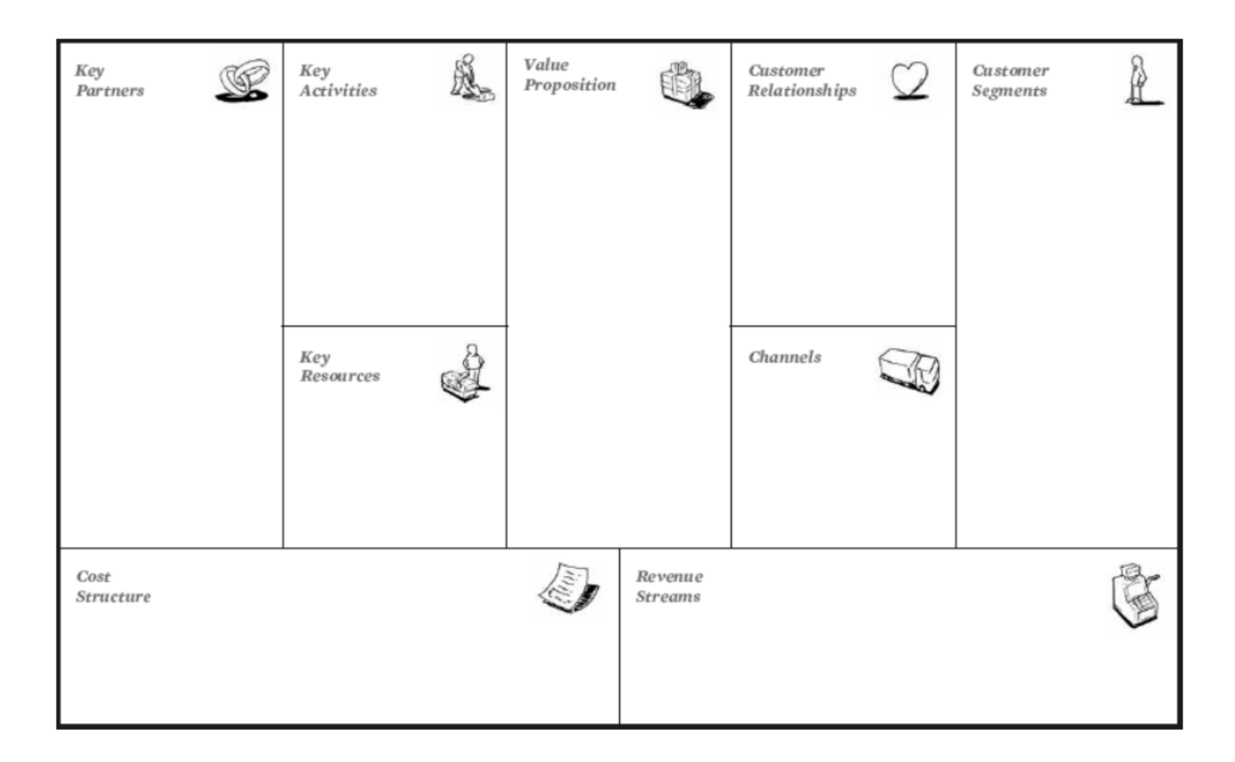


Figure 8. Business model canvas (Osterwalder and Pignuer, 2010).

As seen in Figure 8, the business model canvas (by Osterwalder and Pigneur, 2010) is a composite structure of nine key elements or building blocks as explained below.

4.3.1.1 Customer segments

According to Osterwalder and Pigneur (2010), the customer segments define the groups of people and organisations that a company wants to reach and serve. This is the core of doing business (Osterwalder and Pigneur, 2010), in other words, Osterwalder and Pigneur (2010) describe customers to be the heart of any business model. It is without doubt that any businesses cannot survive in absence of profitable customers for long

(Osterwalder and Pigneur, 2010). They further mention that every company must have defined customers that they serve in order to survive. Different kinds of customers are categorized according to their needs, behaviors, expectations and other common attributes (Osterwalder and Pigneur, 2010). The company must recognize and choose its customer segments and design its business model around them (Osterwalder and Pigneur, 2010). Accordingly, Osterwalder and Pigneur (2010), it is divided the customer segments into Mass market, Niche market, Segmented, Diversified and Multi-sided platforms (or multisided markets).

4.3.1.2 Value proposition

According to Osterwalder and Pigneur (2010), value proposition defines the products and services creating values for the customers or specific customer segments of the company. Osterwalder and Pigneur (2010) further classifies value propositions on the basis of newness, performance, getting the job done, customization, design, brand and or status, price, cost reduction, risk reduction, accessibility and usability. "It is important to note that a thoughtful thinking into right mix of value proposition to be offered to the end customer is significant and this mix requires iterative balancing to ensure customer retainment" (Osterwalder and Pigneur, 2010.)

4.3.1.3 Channels

According to Osterwalder and Pigneur (2010), channels allow companies deliver value proposition to the identified customer segments and lists the typical interfaces being "communication distribution and sales channels through which, an enterprise communicates with the market, about new product releases and product associated informations, establishes sales partnership and talks customer feedbacks" (Osterwalder and Pigneur, 2010.) They further state that: "Channels help maintain good customer experience" (Osterwalder and Pigneur, 2010).

4.3.1.4 Customer relationships

According to Osterwalder and Pignuer (2010), customer relationships is defined as that key building block which allows a company to focus on three key aspects namely;

“customer acquisition, customer retention and increasing sales via customer account harvesting. Account management team plays a key role here in maintaining good customer relationships. Customer relationship has a direct impact to the customer experience” (Osterwalder and Pigneur, 2010.)

4.3.1.5 Revenue streams

If customer comprise the heart of a business model, Revenue streams are its arteries (Osterwalder and Pigneur, 2010). Osterwalder and Pigneur (2010) further states that “as a part of business modelling exercise, it very important to do a “what-if” analysis and consider what revenues streams are going to be generated out of value propositions to be delivered”. This is necessary for the company to keep functioning and conducting profitable businesses (Osterwalder and Pigneur, 2010).

4.3.1.6 Other building blocks

Osterwalder and Pigneur (2010) in describing the business modelling canvas has also highlighted the importance of the building blocks such as Key resources, Key activities, key partnerships and cost structures. While key resources ensure that the business models are implemented as expected, the key activities allow maintaining focus on the value proposition (Osterwalder and Pigneur, 2010). The key partnership allows the company to pay proper attention to those partners necessary for correct functioning of the business model (Osterwalder and Pigneur, 2010). Cost structure is more into financial domain and describes the most important direct and indirect costs incurred during operating a business model (Osterwalder and Pigneur, 2010). Osterwalder and Pigneur (2010) further emphasizes that it is correct to assume that most business models should aim to minimize costs as a much as possible such as no frill airlines, for example, but that is not always the case. Some business models such as designer watches, for example, focus more on value creations rather than minimizing costs (Osterwalder and Pigneur, 2010). Most business models lie in between these two extremes (Osterwalder and Pigneur, 2010).

4.3.2 Service logic business model canvas

“The business logic behind the business model framework established by Osterwalder et al. (2010) is seemingly close to Goods dominant logic.” (Ojasalo and Ojasalo, 2015). Viljakanen et al (2013, 5, cited in: Ojasalo and Ojasalo, 2015) reviewed two versions of the business model canvas (by Osterwalder et al., 2010) and concluded that *“The model itself is not service oriented”* (Viljakanen et al., 2013, 5, cited in: Ojasalo and Ojasalo, 2015). This conclusion formed the need for Ojasalo and Ojasalo (2015) to work on the Service logic business model canvas as shown in Figure 9 below.

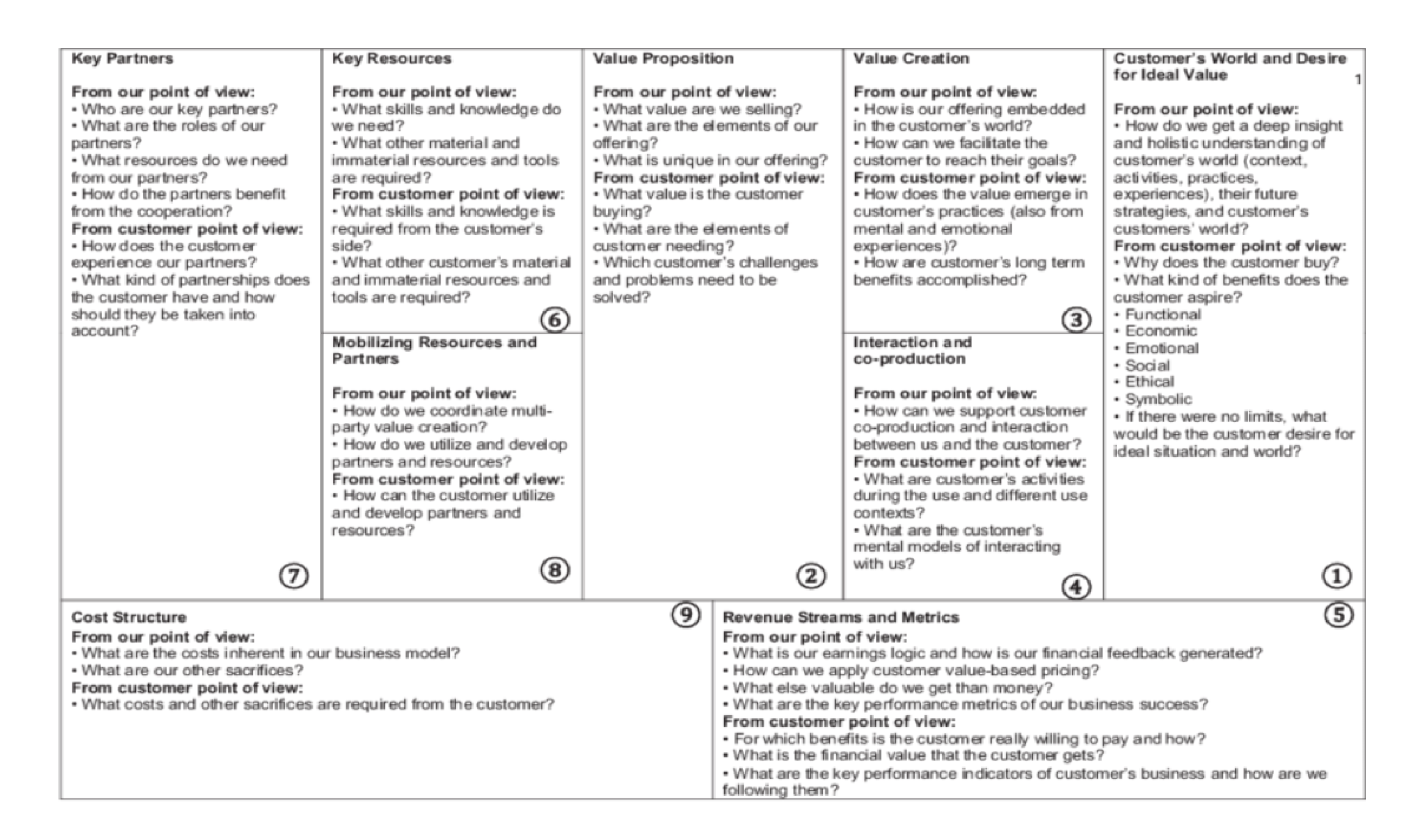


Figure 9. Service Logic Business Model Canvas (by Ojasalo and Ojasalo, 2015).

As seen in Figure 9, there are areas which are similar to the ones covered in the business model canvas (by Osterwalder and Pigneur, 2010) but the modelling basis of the business using service-oriented approach is more pronounced in the canvas as compared to traditional goods-oriented approach of doing business modelling. There are nine blocks similar to the Business model canvas (by Osterwalder and Pigneur, 2010) with additions of set of questions to be answered based upon the customer's and service providers viewpoints as shown below in the Table 14.

Table 14. Blocks and Question sets of Service Logic Business Model Canvas (by Ojasalo and Ojasalo, 2015).

No.	**Block**	**Our point of view** (Ojasalo and Ojasalo, 2015).	**Customer point of view** (Ojasalo and Ojasalo, 2015).
1	Customer's world and desire for ideal value.	- How do we get deep insights into and a holistic understanding of the customer's world, their strategies and their own customers' worlds?	- Why does the customer buy? - What kind of benefits (functional, economic, emotional, social, ethi cal, environmental, symbolic) does the customer desire?
2	Value proposition.	- What value are we selling? - What are the elements that make up our offering? - What is unique about our offering?	- What value is the customer buying? - What are the elements required by the customer? - Which of the customer's challenges and problems need to be solved?
3	Value creation.	- How is our offering embedded in the customer's world? - How can we facilitate the customer to reach their goals?	- How does value emerge in customer practices? (also from mental and emotional experiences) - How are customer's long-term benefits achieved?
4	Interaction and co-production.	- How can we support co-production and interaction between us and the customer?	- What are the customer's activities during use and what are the different use contexts? - What is the customer's mental model of interacting with us?

5	Revenue streams and metrics.	- What is our earning logic and how is our financial feedback generated? - How can we apply value-based pricing? - What do we get that is of value, other than money? - What are the key performance metrics of our business success?	- Which benefits are customers willing to pay for and how? - What is the financial value for the customer? - What are the key indicators of the customer's performance, and how do they follow them?
6	Key resources.	- What skills and knowledge do we need? - What material and immaterial resources and tools are required?	- What skills and knowledge is required from the customer's side? - What other customer material and immaterial resources and tools are required?
7	Key partners.	- Who are our key partners? - What are the roles of our partners? - What resources do we need from our partners? - How do the partners benefit from the co-operation?	- How does the customer experience our partners? - What kind of partnerships does the customer have and how should they be considered?
8	Mobilising resources and partners.	- How do we coordinate multiparty value creation? - How do we utilize and develop partners and resources?	- How can the customer utilize and develop partners and resources?
9	Cost Structure.	- What are the inherent costs in our business model? - What are other sacrifices?	- What costs and other sacrifices are required by the customer?

As seen above in Table 14, the Service Logic Business Model Canvas (by Ojasalo and Ojasalo, 2015) considers organizations as well as the partners point of view and as such this approach is very detailed in nature. This presents an opportunity of service development and improvement paradigm shift to an organization by way of application of light version of the canvas (by Ojasalo and Ojasalo, 2015), for rapid prototyping and business case justifications, and then application of full version of the canvas (by Ojasalo and Ojasalo, 2015) across wider customer base. On a deep level, this type of canvassing can get further into service design methods and approaches. The study researcher has

analyzed that the service logic business model canvas (by Ojasalo and Ojasalo, 2015) is not required in its whole completeness for the purposes of this study. Hence, only necessary elements from the service logic business model canvas (by Ojasalo and Ojasalo, 2015) are considered for constructing the conceptual framework.

4.3.3 Available API Business models in the market

Circa 2005, the market recognized only 4 API Business models (Musser, 2013) were available as shown below in Figure 10.

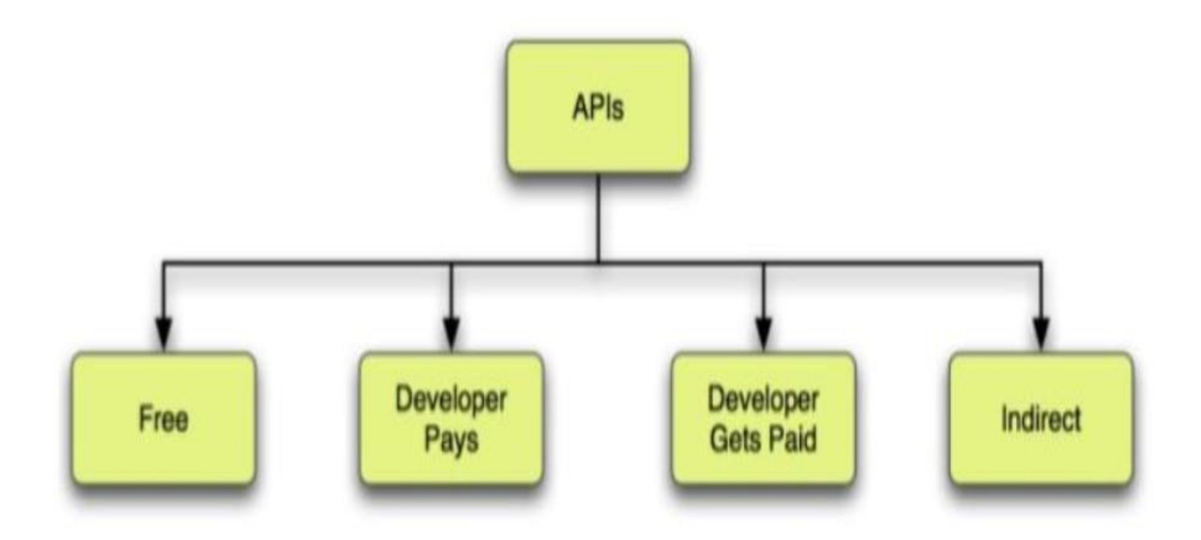


Figure 10. Recognized API Business models in 2005 (Musser, 2013).

As shown in Figure 10, the four recognized API business models in the year 2005 were namely : 1. free, 2. developer pays, 3. developer gets paid and 4. indirect (Musser, 2013.)

According to Musser (2013) as the knowledge, use cases and values of the APIs expanded, the API way of doing business continued to evolve to address this expansion. Circa 2013, Musser once again identified more unique API based business models under developer pays, developers get paid and indirect categories. These new models together resulted in uniquely identified 18 API business models as shown in Figure 11 below.

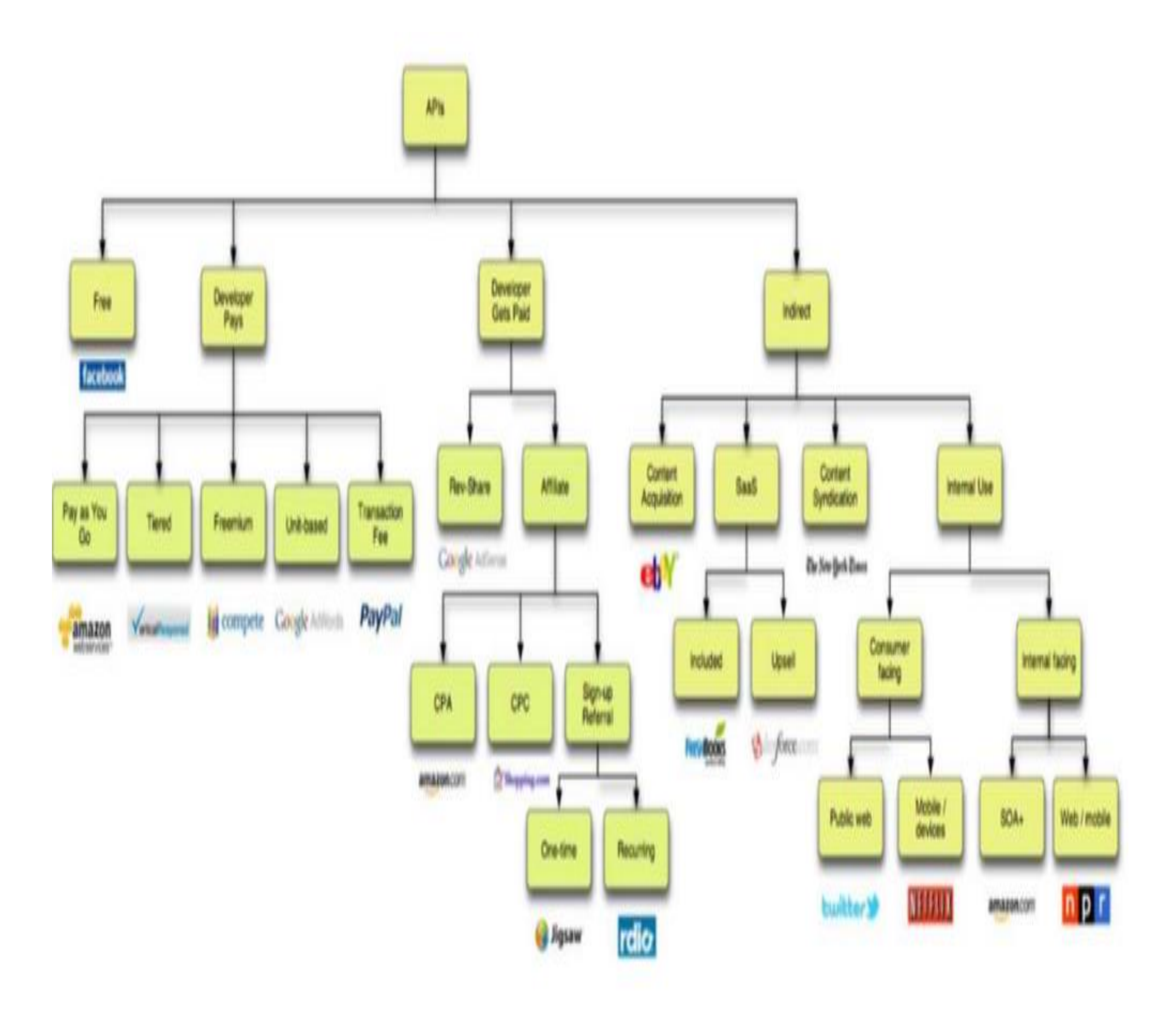


Figure 11. Unique 18 API Business models in 2013 (Musser, 2013).

In-order to explain to the viewers, the working of the unique 18 types of API business models as shown in Figure 11 and justify that these business models can be successfully implemented, Musser (2013) cited few examples of successful enterprises such

Facebook, Amazon web services, Salesforce.com and Mailchimp. In the year 2020, Berlind (2020) appreciated that the 18 API platform business model work done by Musser (2013) “remained to be a body of work that many API economy practitioners still view as current gold standard“ (Berlind, 2020, 4.) However, he felt that the world around has changed and revisited the work done by Musser (2013) in-order to take a comprehensive view in context of the changed world. As a result, Berlind (2020) presented an encompassing view of the various types of API business models as shown below in Figure 12.

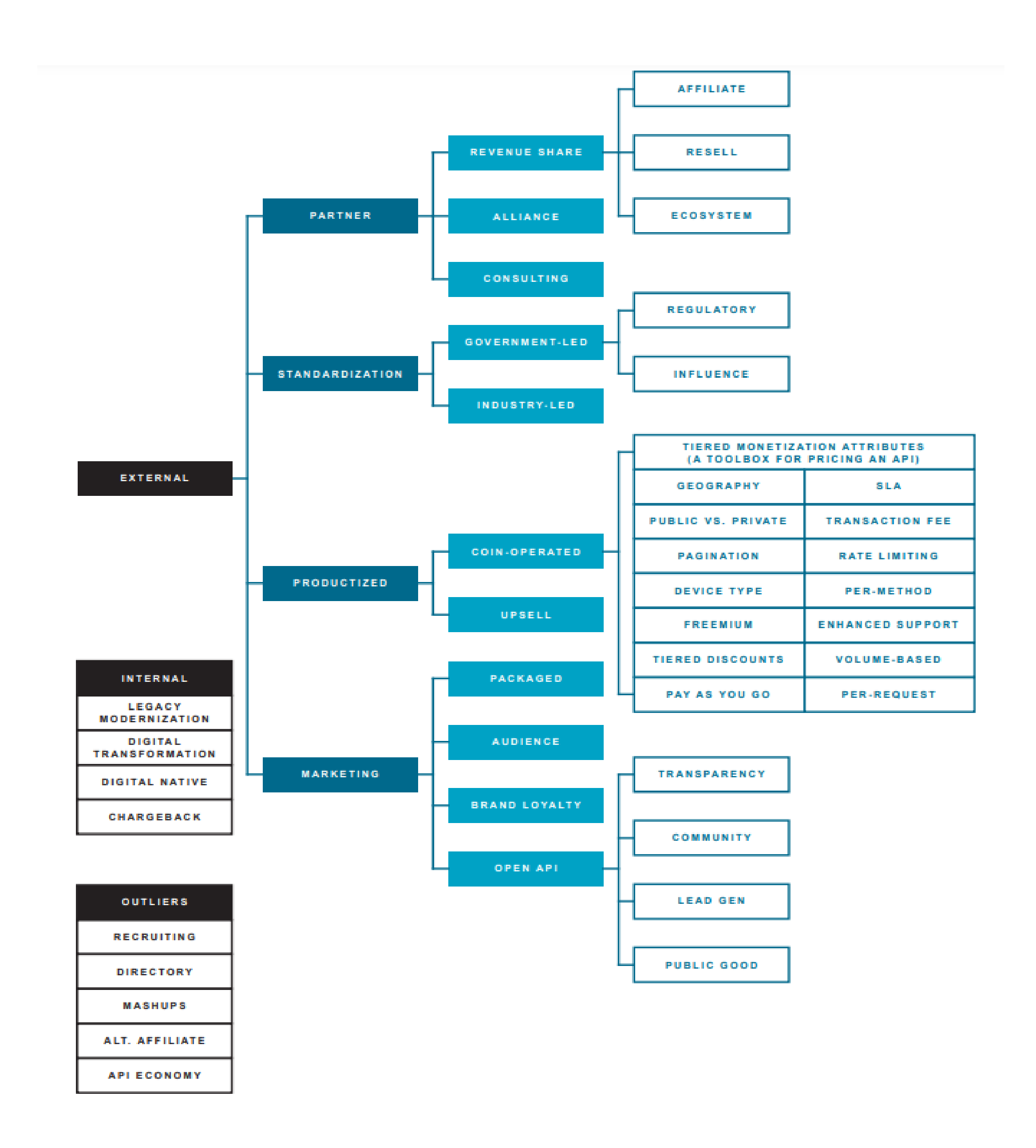


Figure 12. API Business Model diagram (Berlind, 2020).

Before providing an explanation on the API business model diagram as shown in Figure 12, it was pointed out by Berlind (2020, 7) that he has “attempted to design a rubric that is inclusive of current models, and helpful for the companies entering into the API economy”. According to Berlind (2020, 7), “The tree hierarchy attempts to logically organize API business models according to several groupings and sub-groupings. For your monetization conversations, it facilitates important questions like “Should this API be externally exposed outside of our firewall and, if so, should it be productized for consumption by the general public, reserved for partner use, or both”. (Berlind, 2020, 7.)

According to Berlind (2020,10), “The API business models can be divided into two types namely the Internal business models and the external business models”. It is further mentioned by (Berlind, 2020, 10) that the “external business models appeal to those players wanting to contribute to an API economy and capture own values”. He further states that “when organizations consider the idea of joining the so-called API Economy, they are talking about joining the growing list of organizations that have externalized their APIs beyond their corporate firewalls for third-party consumption. Collectively, these external APIs from all these different organizations (a.k.a. “API Providers”) from all around the world form the basis of a global API Economy” (Berlind, 2020, 20.)

Berlind (2020, 20) further states that “At the very moment an organization starts to consider externalizing an API, it is usually doing so with the idea of opening up new, digitally-driven, business or revenue opportunities which in turn is often viewed under the larger rubric of monetizing APIs. However, the idea of monetization is often misconstrued to mean one thing; ringing the cash register according to level of API consumption. Indeed, such “coin-operated” APIs are a form of API monetization”. (Berlind, 2020, 20.)

According to Berlind (2020, 21), within the external business model, “for organizations contemplating the API monetization, Partner programs is the first logical step after their legacy modernization or digital transformation is well underway, opening up a new economy of potential user experiences and revenue-generating tactics” (Berlind, 2020, 21.) Furthermore, the partner programs involve three sub-groups of business models; as explained by Berlind, (2020, 21): “Revenue Share business models can differ in style and purpose. API providers may also seek to offer fee-based consulting to help consumers use their APIs. Lastly, Platform APIs are true partner integrations. Emerging

out of necessity or tech alignment, Platform partner APIs often advance the core competencies of both provider and consumer" (Berlind, 2020, 21.)

As can be seen from Figure 12, Berlind (2020, 25) further points out that revenue share can be broken down into three nuanced types of sharing agreements i.e. Affiliate, Resell and Ecosystem. Further (Berlind,2020,25) defines that "Ecosystem is a type of Partner API model in which The API provider exposes its platform so partners may capitalize on an ecosystem of connections and integrations to other solutions and services. The big difference here is that partners resell entire applications, which in turn, have embedded APIs. The API provider thus strikes a custom deal with partner developers based on revenue sharing" (Berlind, 2020 ,25.) In order to make the viewers understand more, Berlind (2020,25) provides examples as follows : "Large consulting firms such as Deloitte, Accenture, or Capgemini with giant technology contracts has such customer deals with their partners. Whereas, the developer ecosystem around the Salesforce platform includes third-party built turnkey software components (known as Lightning components) that are sold through a Salesforce operated marketplace called AppExchange. Through Salesforce's AppExchange Partner Program, Salesforce offers partners and developers various opportunities to market those wares. The Program grants a share of their revenue, and benefits from the reach and awareness the marketplace drives. The Salesforce developer platform offers custom-tailored Salesforce experiences through Lightning components and SDKs purpose-built for working with specific APIs" (Berlind, 2020, 26.) While explaining the Ecosystem type of Partner API model, (Berlind, 2020,25) mentions "Infrastructure as a Service (IaaS), Business as a Platform (BaaP) and Systems Integrators (SI) being most important key areas" (Berlind, 2020, 25.)

Last but very important, Berlind (2020, 7), highlights "Data" being a Quid Pro Cuo cutting across all business models. In other words, "regardless of whether money exchanges hands as the result of an API interaction, the API provider is always getting new data as a result of that API interaction. What you, as an API provider, do with that data once you've recorded it in your databases and how you derive additional value from it is up to you" (Berlind, 2020, 7.)

The next sub-section discusses the API model canvas by Moilanen (2016).

4.3.4 API model canvas

The API model canvas by Moilanen J. from nordicapis.com (2016) is more application developer oriented or technical in nature with API centricity as the core. The API model canvas is as shown below in Figure 13.

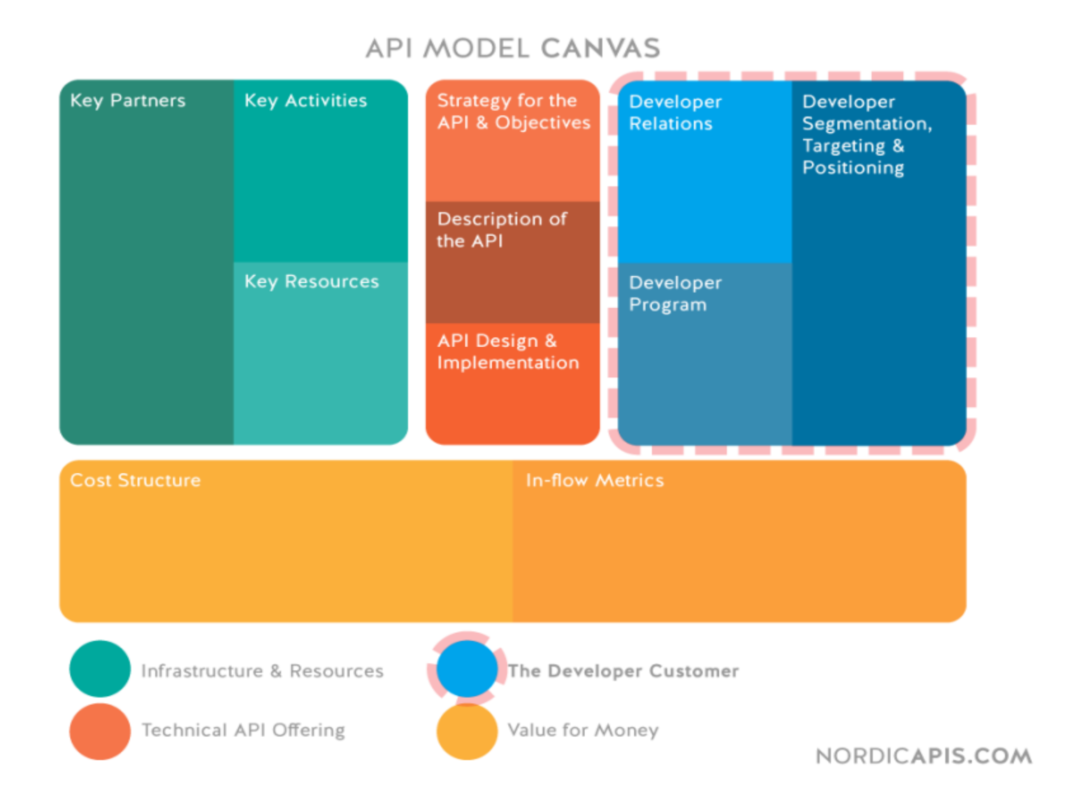


Figure 13. API model canvas (by nordicapis.com, Moilanen, 2016, reinterpreted from Manfred Bortenschlager's Canvas).

As seen in Figure 13, API model canvas by Moilanen (2016), reinterpreted from Manfred Bortenschlager's Canvas, the API model canvas has those business and service related elements common to both business model canvas (by Osterwalder and Pigneur, 2010) and service logic business model canvas (by Ojasalo and Ojasalo, 2015). The key underlying difference is that an API developer is mostly an external party to the API centric organization. Hence it is a logical understanding that proper management is necessary in-order to attract and retain the application developer pool in consuming the API services. For that reason, the API model canvas includes a developer relationship segment (Moilanen, 2016) as one of key building blocks. In API centric way of doing businesses, developers community engagement is extremely necessary as they are ones responsible for technical realization of APIs in-order to the enterprise to successfully participate in an API economy and capture value. Hence, (Moilanen, 2016)

proposes in the API model canvas, another key building block i.e. Developer Program to facilitate, recognize and fulfill the aspirations of the developer community. “Developer portals provide an entry into the API economy as you begin your journey toward developing a business ecosystem” (Malinverno, 2017, cited from : Pettey, 2017). Furthermore, regular communication and interactions with the developer community are key to successful implementations of the Developer Program (Moilanen, 2016). In other words, the developer organization should be managed continuously through dedicated staff and programs should be undertaken in agile way for continuous engagement through marketing and visibility to the developer community in addition to providing secured accesses to the API services. According to Moilanen (2016), “APIs used to be considered only a technical enabler in earlier traditional businesses setup but in API centric way of doing businesses, the APIs should be considered as products with applicable product lifecycle management and product segmentation” (Moilanen, 2016.) Moilanen (2016) further specifies that this challenge can be “addressed in the key element Developer segmentation, Targeting & Positioning”.

The other key elements of the API model canvas (Moilanen, 2016) such as the strategy for an API and objectives, description of an API, and API design and implementation (by Moilanen, 2016) are technical in nature aligned to technical realization of the concept of API as a product. These key elements do not find mention in either business model canvas (by Osterwalder and Pigneur, 2010) or service logic model canvas (by Ojasalo & Ojasalo, 2015).

4.4 Conceptual Framework of this thesis

The Business model canvas by Osterwalder and Pigneur (2010) provides a tooling framework applicable for possible types of businesses modelling. Nevertheless, it focusses more on the “Goods selling” way of doing business. On the contrary, The Service Logic Business Model Canvas by Ojasalo and Ojasalo (2015) leans towards service businesses modelling. Whereas, the API Model canvas by Moilanen (2016) addresses needs of the developer communities, while creating and delivering technology-based values in the digital ecosystem space. Furthermore, the API model canvas covers majorly technical and few limited business aspects of an singular API.

The API platform business is a modern combination business of set of APIs classified as a product to be hosted on API platform and their various features to be consumed as

services . The participating entities in the API platform business collaborate in different roles across the value chain of the API platform business. “It’s one thing to build a platform in a lab; it’s another thing to have actual customers and actual experience and build a platform with live data” (Bendor-Samuel, 2021.)

After analyzing the available literature and best practices, the thesis researcher proposes a conceptual business model framework as shown below in Figure 14.

Key Partners

(Osterwalder et al.,2010)

Partner activities

(Ojasalo et al.,2015)

Partners Costs
(Ojasalo et al.,2015)

Partner Value proposition
(Ojasalo et al.,2015)

Partner relationship management

(Ojasalo et al.,2015)

Key Resources

(Osterwalder et al.,2010)

Key Business and Technical Activities

(Osterwalder et al.,2010)

Value proposition of APIs
(Nordic APIs, 2016)

APIs Description
(Nordic APIs, 2016)

Platform Purpose
(Nicolos Vitalari et al., 2012)

Developer management

(Nordic APIs, 2016)

Developer program

(Nordic APIs, 2016)

Developer Segmentation, Targeting and positioning

(Nordic APIs, 2016)

Partners Revenue streams
(Ojasalo et al.,2015)

Investment costs
(Osterwalder et al.,2010)

Run costs
(Osterwalder et al.,2010)

API Monetization
(Nordic APIs, 2016)

Information Security and Data Privacy needs and costs

Figure 14. Conceptual framework for the API Platform business model merged from relevant elements of available literature.

As shown in Figure 14, the conceptual framework for API Platform business model was constructed by merging the relevant elements from industry best practice and business knowledge available from literature keeping mind the aspects of “value co-creation, co-conversion and co-capturing” (Omar et al., 2013).

Table 15 below summarizes the following elements into the conceptual framework for guiding the next steps in this thesis.

Table 15. Summary of elements of the conceptual framework.

	Element	**Content & reference**
1	Key Partners (Osterwalder and Pigneur, 2010).	This element describes the network of suppliers and partners that make the business model work. Osterwalder and Pigneur (2010) further classifies the Key partners into the following four different types : - Strategic alliances between non-competitors. - Coopetition: strategic partnerships between competitors. - Joint ventures to develop new businesses. - Buyer-supplier relationships to assure reliable supplies.
2	Partner value proposition (Ojasalo and Ojasalo, 2015).	According to Ojasalo and Ojasalo (2015), this element describes API platform provider’s value proposition from partners’ point of view.
3	Partner relationship management. (Ojasalo and Ojasalo, 2015).	According to Ojasalo and Ojasalo (2015), on the scale of economies, it is a general observation that there are involved multiple partners, each with defined value deliverables. To that effect, it is then necessary that the case company while running the API Platform business should proactively manage relationships with the involved partners. This element describes that partner relationship management.
4	Key resources (Osterwalder and Pigneur, 2010).	This design element describes the resources that the API platform provider needs in order to realize the value proposition (Osterwalder and Pigneur, 2010) of the API platform business model.
5	Investment costs (Osterwalder and Pigneur, 2010).	This design element lists down the necessary investment costs for the business model to work. Quite often API provision from own platform means investment before API monetization. According to (Osterwalder and Pigneur, 2010), this construct element addresses what all investments are required for a successful API platform economy business model.
6	Run costs (Osterwalder and Pigneur, 2010).	This construct element provides an estimation of the recurring annual costs that an API Platform economy

		business carries while operating the planned activities and services according to Osterwalder and Pigneur (2010).
7	Developer Program (Moilanen, 2016).	According to Moilanen(2016), the developer program describes the technical relationship management activities relating to how developer organizations and their developers are managed in order to keep technical specialists up to date with API developments and support them with technical questions. This element also includes the roadmap of how APIs are further developed to support new business and technical needs (Moilanen, 2016).
8	Developer segmentation, targeting and positioning (Moilanen, 2016).	According to Moilanen (2016), this construct element "describes the plan for different segments of the developers, how they are supposed to be engaged via targeted approaches and appropriate positioning" (Moilanen,2016).
9	Developer relationship management (Moilanen, 2016).	According to Moilanen (2016), this construct element describes "how to manage and maintain good relations with the developer organization(s) as well as developer community when they are developing their services using organizations set of APIs" (Moilanen,2016).
10	Value Proposition of APIs (Moilanen, 2016).	This is the most important design element of the conceptual framework. Moilanen (2016) highlights the importance of this key element by stating that "this design element gives a viewer an understanding about what business and technical values an API or for that matter collective set of APIs are going to bring to the developer when to be utilized in their services and product developments" (Moilanen,2016).
11	Description of APIs (Moilanen, 2016).	This design element describes the APIs, including business and technical content such as business purpose, data and functions provided (Moilanen, 2016).
12	Key business and technical activities (Osterwalder and Pigneur, 2010).	According to Osterwalder and Pigneur (2010), this construct element describes "both business and technical level tasks required to be completed by API providers' in-order for successful value contribution in the API Economy" (Moilanen, 2016).
13	Platform Purpose (by Vitalari and Shaughnessy, 2012, cited in: Holley et al., 2014,11).	This construct element describes what is the purpose of the Platform (by Vitalari and Shaughnessy, 2012, cited in: Holley et al., 2014,11) in an API economy.
14	API monetization (Moilanen,2016).	This construct element describes "how API providers receive revenue and income when offering APIs to developer organisations" (Moilanen,2016).
15	Information security and data privacy needs	In the digital way of doing businesses via API Platform, data sharing is at the core and hence the security and privacy is by design baked in most of the modern model as compared to traditional ones. Nevertheless, considering the criticality

		of this topic, it is added as a key element according to Osterwalder and Pigneur (2010).
16	Partner Activities, Partner costs and Partner revenue streams (Ojasalo and Ojasalo, 2015).	Partner Activities, Partner costs and Partner revenue streams are from the partners viewpoints on which activities or role they would want to contribute, their own involved costs and what revenue streams they would want to generate out of the collaboration. These elements are very specific to the partners hence the thesis researcher has taken a prudent approach of not going into details while conducting research on these construct elements within the conceptual framework.

This conceptual framework is to be used as a guide and basis for building a co-creation initial solution proposal for the case company in the next section.

5 Building Proposal for API Platform Business Model for the Case Company

This chapter merges the results of the current state analysis and the conceptual framework towards the building of the Proposal based on internal co-creation and discussions.

5.1 Overview of the Proposal Building Stage

The goal of this section is to present the steps in the proposal building of API platform business model for this study.

The current state analysis allowed to identify the strength and weaknesses in respect to the API platform business in the case company. Focus areas were selected based on identified weaknesses. For the selected focus areas, available literature was studied to build a conceptual framework for the API platform business model. This conceptual framework was then used to build an initial proposal for the API platform business model in the case company.

First, the study researcher identified the key stakeholders to be involved in the co-creation sessions. The involved identified stakeholders were Enterprise architect, account manager and business development manager i.e. internal staff of the case company. Next, co-creation sessions were organized. The co-creation sessions started by setting an agenda. Objectives and expected outcome of the thesis were recapped and the idea of co-creating solutions was explained. Necessary practicalities in respect to involvement of the stakeholders were addressed and confidentiality aspects were agreed. The rationale guiding this approach was that it was necessary for the study researcher to identify those stakeholders who can bring required value for the proposal building. Moreover, the identified stakeholders belonged to different line organizations and hence it was important for the study researcher to do a stakeholder alignment in-order to get them involved in realization of the expected outcome of this thesis.

Second, summarized results of strengths, weaknesses and selected focus areas for development were presented. Conceptual framework for the API Platform business model was explained and insights of a possible API platform business model solution idea was presented. The rationale behind this approach was present the involved

stakeholders with a view of “on-the-ground” situation and to reduce the time taken to onboard the key stakeholders.

Fourth, during the co-creation sessions, inputs were gathered from the key stakeholders and summarized to be used to create the initial solution proposal for the API platform business model for the case company. A summary of inputs provided by the key stakeholders in co-creation of the initial proposal is shown further in Table 16 below.

Finally, validation sessions were organized with the key stakeholders and the co-created initial solution proposal was presented to the key stakeholders to provide validation feedbacks. The validation feedbacks were used to develop the initial proposal into a final proposal of the API platform business model for the case company. A summary of validation feedbacks is shown in Table 17 below.

5.2 Findings from Data 2 (pulling together CSA, CF and Data 2 for the Proposal)

The collected inputs from the involved key stakeholders are summarized and shown below in Table 16.

Table 16. Key stakeholder suggestions (findings of Data 2) for Proposal building in relation to findings from the CSA (Data 1) and the Conceptual framework.

	*Key focus area from **CSA** (from **Data 1**)*	*Input from literature (**CF**)*	*Suggestions from stakeholders for the Proposal, summary (from **Data 2**)*	*Description of their suggestion (in detail)*
1	Developing an API business model	Business model canvas (Osterwalder and Pigneur, 2010). Service logic business model canvas (Ojasalo and Ojasalo, 2015) API business model canvas (NordicAPIs, 2016)	a) Draft a proposal for the API platform business model for the case company.	Key stakeholders suggested to design an initial solution proposal based on best practices literature in-order to address identified key weaknesses. It was highlighted that the “API Centric” solutions are in the Enterprise Architecture strategy of the case company as a part of re-positioning itself as a digital transformation partner for the customers in mining and minerals sector and a concrete proposal is required to communicate the needs to the different units of the case company.

	Developing an API business model	- Key Partners (Osterwalder and Pigneur, 2010). - Key Resources. (Osterwalder and Pigneur, 2010). - Key Business and Technical activities (Osterwalder and Pigneur, 2010). - Investments and run costs (Osterwalder and Pigneur, 2010). - Information security and data privacy. - Partner value proposition (Ojasalo and Ojasalo, 2015). - Partner activities (Ojasalo and Ojasalo, 2015). - Partner relationship management (Ojasalo and Ojasalo, 2015). - API monetization (Moilanen, 2016).	a) List Key partners. b) List Key resources. c) List key business and technical activities. d) Include sales and marketing efforts and investments costs. e) Propose partner value propositions. f) Clarity on partner activities. g) Include role for partners relationship management. h) Make it cloud based. i) Include run services costs. i) Include Enterprise security and information data privacy policies. j) List API value proposition and monetization opportunities.	The Enterprise architect advised to list down key partners and key resources to understand the necessary capabilities to be built within the case company for the API business model. Also, it was recommended by the EA that the solution proposal should cover business as well as technical activities so that a clear view is gained by the business and delivery line units. The business development manager suggested to calculate and include possible sales and marketing efforts and investments costs for business case justifications. The business development manager suggested to propose possible value propositions to the partners and provide clarity on partner activities to convince and onboard the partners to the API platform. The account manager suggested to identify and include a dedicated role for partner relationship management and suggested that the solution proposal should, if possible, should calculate and list run services including the service management costs. The Enterprise architect also pointed out that the solution proposal should pre-dominantly be cloud based. The enterprise architect recommended that the solution proposal should cover business as well as technical activities so that a clear view is gained. The enterprise architect advised that the solution proposal should be built the case company's applicable information security and data privacy policies. The business development manager suggested to list down possible revenue generation and monetization opportunities for business case justification.

	Focusing on Purpose driven platforms	Platform purpose (by Vitalari and Shaughnessy, 2012, cited in Holley et. al., 2014)	a) Define platform purpose.	The Enterprise architect advised to define the platform purpose in-order to provide clarity and manage expectations of the platform users.

As seen above in Table 16, it can be understood that almost all the informants were looking for business models and tools to either manage customer expectations arising out of digital needs or address the strategic needs arising out of internal transformation of the case company. Though the inputs provided by co-creator were from own domain perspective, the in-principle agreement was that a proposal on API platform business model for the mining and minerals sector is needed.

> *"This is a good start. When the proposal is ready, I would recommend to get it validated from our business development director"* (Business development manager, case company).

> *"If you can propose a good fit API platform business model, I will take it to our architecture review board to see if we can roll out this, to our different locations"* (Enterprise architect, case company).

Based on the inputs provided by the stakeholders, a co-created initial proposal was created, which is described next.

5.3 Proposal Draft / Initial Proposal

In this section, a co-created initial proposal of the API platform business model for the case company is described. The elements considered in the initial proposal are described below.

5.3.1 Key partners in the API platform business model

Since the API platform business model is a co-created digital API platform based solution to the mining and minerals sector, the key partners to the co-created solution are summarized and as shown in Table 17 below.

Table 17. Key Partners (Osterwalder and Pigneur, 2010) in the API platform business model.

	Key Partners
1	Identified customer from the mining and minerals sector looking for digital transformation ways to unlock the value of gathered installed base data, know-how and business logic expertise to explore opportunities of revenue generation.
2	Third party developers and players providing services and niche solutions in the mining minerals industry. There are sizeable amount of small and medium players providing consulting and training services or niche product-based solutions to the mining and minerals sector. Such players are key using side partner candidates to use the various features of installed base API and strengthen own positions in the value chain of the mining and minerals sector.
3	Azure cloud capacity and computing partner. The reason for selection of MS Azure as a preferred cloud partner amongst other partners is that the case company has platinum level global partnership agreement with MS Azure for many co-created success stories for other cloud-based solutions.
4	Citrix networking partner. The API Platform is network intensive on a global salce and requires a fast, reliant and secured network setup. Citrix provides market tested global scale networking solution. Hence, it has been listed as a key partner to the initial solution of the API Platform business solution.
5	Development and maintenance partners. The development and maintenance partners technically develop and maintain the API platform, installed base API, and other offered services such as reporting capabilities on the API platform. This is required in-order for the various partners to either act as providers or users in the API Platform ecosystem.

5.3.2 Partner activities in the API platform business model

In this proposal, the identified customer from the mining and minerals sector acts as the primary data provider to the ecosystem by providing curated and expert knowhow digitized installed base data and business logics for the mining and minerals sectors. The third-party developers engage with API Platform to primarily to develop own analytical products and expert solutions for the mining and mineral sector using the services offered on the API platform. Other key partners such as businesses operating in the mining and mineral sector primarily consume the installed base API services to deliver value to own customers by using the API platform services. The training partners will utilize the offered API platform services and optimize their training solutions for the mining and minerals sector.

While the above partner activities are covering the business aspects of the solution, it is imperative in today’s digitally connected world that the technical setup should be fast,

stable, and well-functioning with ability to manage and quickly resolve any technical issues from the operating environment. This is necessary to keep the API platform functioning as expected in-order to fulfill the core purpose of the API platform business model. The technical partners MS Azure and Citrix networking solutions along with case company's own technical staff are responsible for these key technical activities.

To summarize, in this co-created solution, the partner activities are falling either on the using side where operators, third party developers, training organizations in the mining and mineral sectors are using the API Platform business services primarily through various features of the installed base APIs or on the supply side such as the case company, case company's development and maintenance partners, and the identified customer operating in the mining and minerals sector.

5.3.3 Partner Costs in the API platform business model

It is proposed that the partners should bear all the costs relevant to the role they are going to play in the API platform business ecosystem. For example, the identified customer from the mining and minerals sector will bear the cost for the installed base data and business knowhow collection, curation and provisioning.

5.3.4 Partner Value Proposition in the API platform business model

The value proposition to each partner is dependent on the role that particular partner is playing in the API platform business ecosystem. For the case company's identified customer, the value proposition is that it will be able to capture value by able to safely extend the consumption outreach of its valuable installed base data and know how expertise assets from its own databases and systems. Besides monetization aspect, it will also gain prominence within the domain of its operations.

The value proposition for the development partners is that they will generate revenue by doing development and maintenance. For the third-party developers, the value proposition is that they have a huge curated installed base data available for development of own niche analytical and technical product for the mining and minerals sector.

For training service providers, the value proposition is to optimize training solutions offered by them to the mining and mineral sectors. This allows the training service providers to deliver more training services at short intervals thereby possibility to increase sales and revenue.

5.3.5 Partner relationship management in the API platform business model

The solution proposes a dedicated partner manager to manage the contractual agreements with the identified and onboarded key partners. It is further proposed that the dedicated partner manager should be insourced from internal staff rather than outsourced.

5.3.6 Partner revenue streams in the API platform business model

The supply side business partners are able to generate revenue by sharing installed base data and business expertise knowhow. The supply side technical partners are able to get revenue through selling of cloud and networking services, development consulting and doing developments and maintenance. Whereas, the using side partners are able to generate revenue through developing and selling their own niche products such as analytical products around the features of installed base API.

5.3.7 Platform Purpose in the API platform business model

The purpose of the API platform is to provide a stable and secured digital foundation framework for the supply and demand side business and third-party development partners. Such digital foundation allows the interacting parties to exchange and use data driven services seamlessly, fast and at scale allowing to productively engage with the platform to maximize own returns on investment . The API platform will host operational instance of the installed base API, which can be accessed through platform hosted API gateway. Furthermore, the platform consists of three technical environments : a. development environment for doing the necessary developments, b. testing environment for executing testing scripts such as business logic testing and load testing under testing automation framework and c. operational environment for the users and suppliers to seamlessly transact using real installed base data.

5.3.8 Investment and run costs for the API platform business model

Investment costs and run costs comprises of costs involving technical components such as infrastructure, networking, own IT systems and human efforts costs required for technical and business activities such as setting and installations of the environments, developments and maintenance activities and selling of platform services. In the initial proposal, it is estimated that the setup of API Platform ecosystem will need 5-6 calendar months. Business activities such as initial marketing, promoting and sales, contracting will need involvement of 0.5 full time equivalent (0,5 FTE) whereas there are estimated 2 FTE's for doing the necessary technical activities during the estimated calendar months. Furthermore, for estimation purposes, 0.5 FTE is calculated for managing the operations and 2 FTE's for handling the technical issues. Average prevailing wages and technical component costs from the Nordic market were used to calculate the investment and run costs as shown in Table 18 below.

Table 18. Estimated investment and run costs.

Costs Types	Calculations	Duration	Estimated costs
Business activities	0.5 FTE @ 7000€ per month.	3 months	10,5K €
Technical activities	2 FTEs @ 7000€ per month.	6 months	84K €
Technical investments	@ 3000€ per month	6 months	18K€
Estimated total costs of investment			112,5K €
Run costs	2,5 FTEs @ 7000€ per month + 3000€ per month technical costs	Annual	246K €

As seen from Table 18, the total costs of investments are estimated to be 112,5K € whereas the annual run cost is estimated to be 246K €.

5.3.9 Key resources for the API platform business model

The key resources of an ecosystem are people, processes, organizations, technical and digitalized data assets. In the proposed API Platform business setup, the case company neither owns nor provide any data assets or installed base knowhow. Moreover, the case

company is not operating in the domain of mining and minerals sector and hence domain specific processes are out scoped from the proposed solution. Identified key resources for the API platform business model are as shown in Table 19 below.

Table 19. Key Resources for the API platform business model.

	Key Resources	Responsiblities
1	Business development responsible.	Belonging to organizational sales unit and responsible for selling API platform services and revenue generation.
2	Development managers.	Belonging to delivery organization and responsible for development delivery happening from own internal and outsourced development partners.
3	Platform owner.	Belonging to delivery organization and responsible for API platform upkeep and functioning.
4	Partner Manager.	Belonging to delivery service line organization and responsible for managing partners.
5	Cloud capacity	Technical capability needed for upscaling or downscaling of API platform services on demand.
6	Developer portal	Engagement channel to keep engaged developer partners and own internal development staff for productive developments on the API platform.
7	Information security and data privacy manager	Belonging to Security line of the organization and responsible to ensure that the API platform security is in line with the applicable organizational security and data privacy policies.

5.3.10 Key Business and technical activities in the API platform business model

In-order for the API platform business model to serve the core purpose of acting as a digital enabler for the identified customer to successfully participate in the API economy of the minerals and mining sector, its implementation and that of hosted installed base API has to be stable and well-functioning. Otherwise, besides defeating the purpose of the platform, it will also cause business value and brand erosion for the case company. Therefore, it is important to identify and list down the key business and technical activities for the ecosystem are identified and summarized in Table 20 as below.

Table 20. Key business activities in the API platform business model.

	Key business activities (Osterwalder and Pignuer, 2010)
1	Management of business with the development organization.
2	Business development and management with the user partners (demand side) and installed base data and knowhow partner.
3	Costing and finance management.

During the initial stages of implementation of the solution, the thesis researcher proposes to put more efforts in onboarding of the development partners and user organizations. The case company’s data and knowhow customer in the mining and minerals sector is already onboarded. Furthermore, the cost calculations and business case development with onboarded partner will ensure that expectations of involved parties are clarified and agreed upon.

While the key business activities will cover the business side of the API platform business model, the technical implementation and operational maintenance of the solution proposal is realized by the key technical activities as shown in Table 21 below.

Table 21. Key technical activities in the API platform business model.

	Key technical activities (Osterwalder and Pignuer, 2010)
1	Platform setup using agile and optimized methodologies such as Devops.
2	Requirements specifications and support to the developers for getting the developments delivered as agreed.
3	Management of Developers through program management and portal activations.
4	Platform ecosystem service developments and maintenance.
5	Testing of the delivered developments using testing automation framework.

5.3.11 Value Proposition of the APIs in the API Platform business model

The identified customer from the mining and minerals sector has acquired rich installed base data and business know how assets, which are elements passive in nature and utilized so far, only for own operations. The identified Installed base API through the API Platform setup open ups additional revenue streams for the identified customer by providing means and mechanisms of necessary technical entablements such as technical interfaces, for example, to digitalize, share and capitalize own installed base data and business know how in a safe and reliable manner. Remaining collaboration partners are able to generate their own revenue streams by providing digitalization services or developing own niche products or training services depending on the role being played in this "API Centric" ecosystem.

5.3.12 APIs Description of the Installed base API

The installed base API identified in the initial solution proposal is to be used heavily in the API Platform business model by the onboarded business partners and third-party developers. The installed base API is a core API servicing multiple entities such as development partners providing secondary solutions and products, business consumers for addressing their own business needs and furthering business interests, training partners to accelerate onboarding of new staff to the businesses in the mining and minerals sector. On a whole, this core API will allow different partners with the API Platform ecosystem to grow up at different levels, within their respective value chains, in the minings and minerals sector.

The main function of the installed base API is to provide curated installed base data and knowhow to authorized partners through API gateway. Available Various features of installed base API will allow partner users to get focused results thereby justifying their own costs.

5.3.13 APIs Monetization in API platform business model

The installed base API monetization is the core value proposition for the case company out of the solution proposal. The identified customer from the mining and minerals sector has clear understanding on value unlocking of it's own gathered installed base data. Within the API economy, the case company is providing a functioning platform setup for

the identified customer to realize “value unlocking” and collaborate. Therefore, it is proposed that preferred monetization approaches could be “pay as you go” transaction-based fees, volume tiered transaction-based fees or monthly subscription fees.

5.3.14 Developer management in the API Platform business model

A developer program is of prime importance to ensure correct management of the involved development parties within the API Platform business ecosystem. Such program will allow proper management of the technical compatibility and involved IT systems and setup. Contracts will be activated with the onboarded development partners to deliver and use the services of the API Platform setup underpinned by market linked service level agreements and organization level agreements. A dedicated developer program manager will ensure that development partners honor the agreed SLA’s and OLA’s. According to the API Lifecycle management best practices, it is a natural outcome that there will be multiple versions of the installed base API available to be used. It is estimated there will be 4-5 versions during the installed base API lifecycle. Hence, an UpToDate documentation is made available on installed base API web page within the API Platform setup covering the technical and business functioning of installed base API as well as documentation for both, the current version and end of life cycle versions of the installed base API. This acts as an effective enablement them to develop their own products addressing the market needs realizing their own business benefits in the API Platform business ecosystem.

Furthermore, the case company is required to maintain proper versioning and records of the versions being used by the development partners allowing case company to understand and properly manage the development partners expectations and delivery. Moreover, necessary online technical support to address any technical issues is available to the development partners within the agreed service level agreements. There will be bi-weekly on-line meetings between the nominated development partners program manager and the development partner side nominated single point of contact to tackle any relationship and service level agreement issues on both sides. Whereas, all contract matters arising from such bi-weekly meetings and or renewals will be handled by the respective organizations nominated contract managers.

To summarize, effective developer management will allow the case company to efficiently deliver stable and functioning API Platform services to the involved partners in platform business ecosystem of the case company.

5.3.15 Information security and data privacy in the API platform business model

Since proprietary installed base data and business know-how of the identified customer is being exposed via the API Platform setup to the wider community present on the internet, there is a need to have appropriate information security and data privacy mechanism in place. As the API platform is a pure play technical setup showcasing the ability of the case company to co-create solutions addressing the API economy needs of the customers from the mining and minerals sector, it is necessary to keep the setup safeguarded. Hence, the information security will be handled and managed by operational Enterprise level cybersecurity unit of the case company whereas all the relevant data privacy managements with development partners and other partners will be done as per the applicable processes and contractual agreements of the case company in accordance to the prevailing European General Data Protection Regulations (GDPR).

5.4 Summary of the initial proposal

A summary of the initial proposal is shown below in Figure 15. It allows simplification and better illustration from a bird’s eye view perspective. Detailed description of the shown key elements is available in Chapter 5.3.

Key Partners
- Niche Products and solution Partners
- Collaborating partners
- Azure Cloud partner
- Citrix networking partner
- Development and maintanence partners
- Providing installed base data and expertise know-how

Partner Value Proposition
- Possibility to develop and sell digital products and services around acquired installed base data
- Increased brand value in the digital way of doing business

Platform Purpose
- Enable Partner(s) to collaboration and sell digital products and services around acquired installed base data.
- Allow seamless ”on demand” digital transactions at scale by ”API Centricity” approach
- Hosting installed base API for Partners

Key Resources
- Cloud capacity
- Business development manager
- Development manager(s)
- Platform owner
- Partner manager
- Developer portal
- IT Security manager

Value Proposition of API
- Digitalization of installed base data and know-how assets
- ”On demand” business collaboration
- Faster developments of own niche products and solutions
- Additional revenue streams

Developer Management
- Dedicated development managers
- Regular weekly and monthly meetings discussing SLA's and KPI's
- Online support portal for technical issues
- Installed base API versioning and documentation

Partner Activities
- Providing actionable installed base data
- Providing business expertise and logics.
- Providing cloud and networking services
- Developing own products
- Business collaboration
- Developments & maintainence

Partner relationship management
- Supplier partners
- User partners
- Development partners

Key Business and Technical activities
- Management of Partners.
- Business case and Finance management
- Business development
- Costing and Finance management
- Developments and maintainence
- Testing

APIs Description
Installed base data

Developer Segmentation
- 3rd party apps developers
- Data service(s) providers

Investments costs
- Cloud Capacity
- Development
- Business development

Estimated ~ 112,5 K €

Partner Costs
- Development & maintainence
- Infrastructure costs
- Management costs
- Supplying installed base data and development consulting.

Partner Revenue streams
- Selling products and solutions developed around installed base data
- Selling Installed base data

Run costs
- Cloud capacity and networking
- Maintainence
- Management of partners

Estimated ~ 246K € Annually

API Monetization
- Monthly subsctiption based fees
- Volume Tiered based fees
- Pay as go direct transaction based fees

Platform Information Security and Data Privacy

- Enterprise level information security policies and data protection policies.

Figure 15. Initial proposal of the API platform business model for the case company.

Next, Chapter 6 describes the validations on the initial proposal and presents the final solution proposal for the API platform business model.

6 Validation of the Proposal

This chapter reports on the results of the validation stage and points to further developments to the Initial proposal of the API platform business model. At the end of this section, the Final proposal is presented.

6.1 Overview of the Validation Stage

The goal of this section is to present the steps executed in the validation phase of API platform business model for this study. In the Initial proposal building phase explained in Chapter 5, conceptual framework and inputs from key stakeholder collected in Data 2 were used to co-create an initial proposal for the API platform business model.

In this chapter, the validation logic, development recommendations from key stakeholders collected during data collection round Data 3 and implementation of the development recommendations to the Initial proposal are explained in details.

First, the validation sessions were conducted by organizing sessions to cover business and technical components of the initial proposal. The key stakeholders involved in validating the initial proposal were Enterprise architect, Business development director, Business development manager, Account manager, Technical development manager and IT and cyber security manager. During the validation sessions, topics such as purpose, practicalities and confidentiality were discussed and agreed. A recap was done on the earlier inputs provided by the involved key stakeholders in the co-creation of the Initial proposal. Then, a detailed explanation on the Initial proposal was given. The rationale guiding this approach was to align the old and new key stakeholders to the same level of understanding.

Second, the involved key stakeholders were requested to validate and provide development feedbacks to the Initial proposal. The rationale behind this approach was that it was necessary for the study researcher to subject the Initial solution proposal to the informed opinions, constructive criticisms and validation feedbacks from the involved key stakeholders. As this approach presented the study researcher with an opportunity to develop and refine the initial solution proposal.

Third, the collected feedbacks from validation sessions were analyzed and summarized to identify and plan the implementation of the developments to the Initial solution proposal. The developments to the identified element were then implemented to prepare the Final solution proposal.

6.2 Developments to the Proposal (based on Data Collection 3)

In the validation phase, the following development topics (data Collection 3) were found. The data collection 3 is focused on the contents of the initial proposal and aims to finalize it based on the collected feedbacks from the existing and newly identified stakeholders.

Table 22. Expert suggestions (findings of Data 3) for the Initial proposal.

	Element 1 of the Initial proposal	*Parts commented in Validation*	*Description of the comment/ feedback by experts (in detail)*	*Development to the Initial proposal*
1	Key Partners	a) Cloud Partners	The business development director suggested to include additional cloud and networking partners to not make the solution Azure and Citrix dependent. The enterprise architect suggested to include own home-grown cloud setup as an additional cloud partner as it is a directive from the parent company to promote own cloud setup as an alternative to Azure and AWS.	Inclusion of Amazon web services, Cisco and own home- grown cloud setup as additional partners in the key partner element.
		b) Training Partners	The business development director suggested to omit the training partners as key partners in-order to keep the value proposition of the API Platform business model restricted to real users of the installed base data.	Omission of training partners from the initial proposal and from the key partners listing in the key partner element
	Element 2 of the Initial proposal	*Parts commented in Validation*	*Description of the comment/ feedback by experts (in detail)*	*Development to the Initial proposal*

1	Investment costs.	a) Human resources costing.	The technical development manager pointed out that there is a possible under estimation of human resource costing given that platform developments are yet to be fully scoped and there is always a possibility of human efforts becoming significant when the scope of the platform developments and installed base API is fully understood. It was suggested to re-estimate the technical activities costs and consider more efforts and term it as an initial investment cost for business case justification. The business development manager suggested re-estimate the business activities costs.	Recalculation of the investment costs and renaming the key element as initial investment costs.
		b) Infrastructure costing.	The platform owner mentioned that the entry level costs of cloud partner requires fair estimations as those are at the moment low. In the future, the infrastructure costs will grow as while the networking partners charges us a fixed monthly fee for the broadband connectivity, the cloud partners have usage-based charging.	Recalculating the cloud capacity costing.
	Element 3 of the Initial proposal	*Parts commented in Validation*	*Description of the comment/ feedback by experts (in detail)*	*Development to the Initial proposal*
	Information security and data privacy	API Platform Information security and data privacy	The IT security manager pointed out that the case company's enterprise level information and security policies are applicable to all the developed solutions within the case company, as a standard practice, but in this particular case of the API platform business where propriety data and knowhow is exchanging hands and the usage of the solution is extended to a web wide audience, it is important to have authentication mechanism in place.	Inclusion of Authentication mechanism in the information security and data privacy key element.

Besides providing development recommendations, the experts generally commented on the need of conducting a detailed risk analysis as a policy to investigate and provide mitigation plans to those identified risks. It was also highlighted that a detailed technical plan is required to justify the investment costs. Additionally, the account manager commented generally on automatizing of the invoicing process. Implementing an automatic invoicing process will allow the partner managers to productively focus more on partners relationship management instead of addressing invoicing related queries arising due to the current manual process. Other general topics commented were regarding applicability of this solution to the Finnish market or possibility to make it global, can the development work and maintenance be in-sourced instead of outsourced. While the general comments were noted, the expert comments on the initial proposal were implemented in-order to develop the final proposal.

6.2.1 Developments to Element 1 of the Initial Proposal

During the validation discussions, a valuable insight was provided by the business development director that the dependency of the case company on Azure will increase tremendously when the solution matures.

> *"We have platinum level partnership with two of the market leaders providing cloud services that is Azure and Amazon web service. This is a duopoly, nevertheless it allows us to lessen our risks"* (Business development director, case company).

Monopoly of Azure as cloud services partner and Citrix as networking services partner to the proposed API platform business model will result into the case company getting into a "vendor lock-in" situation. The business development director of the case company identified this type of situation to be a key risk in operating the API platform business model and delivering value, while being a focal enterprise, within the API economy of the mining and minerals sector. To mitigate this risk, it recommended by him to include Amazon web services from the cloud services provider segment and Cisco from the networking services provider segment, as additional key partners to the proposal.

6.2.2 Developments to Elements 2 of the Initial Proposal

Based on the recommendations from the technical development manager, the business development manager and the platform owner, the investment costs were re-estimated as shown in the below Table 23.

Table 23. Revised Estimated investment costs.

Costs Types	**Calculations**	**Duration**	**Estimated costs**
Business activities	1 FTE @ 7000€ per month.	3 months	21K €
Technical activities	4 FTEs @ 7000€ per month.	Estimated ~ 5- 6 months	168K €
Technical investments	@ 3500€ per month	Estimated ~ 5- 6 months	21K€
Estimated total costs of investments			210K €
Run costs	2,5 FTEs @ 7000€ per month + 3000€ per month technical costs	Annual	246K €

6.2.3 Developments to Elements 3 of the Initial Proposal

While presenting the initial solution proposal to the existing and new stakeholders, there was a discussion on the applicable Enterprise level information security and data privacy,

> *"Our Enterprise level information security and data privacy policies are available to be applied to the solutions by the case company and the case company's own operations follow them mandatory".* (Cyber security manager, case company).

The cyber security manager pointed out that it was good that the initial proposal included the case company's Enterprise level information security and data privacy policies as one of the key elements therefore, the initial proposal is aligned with the mandated security policies and procedures of the case company. This ensures that the solution is safeguarding the case company's own internal systems.

On the contrary, since the solution is exposing identified customer's proprietary installed based data and knowhow through its own setup to web based wide audience, it is very important to separately put proper restrictions mechanism on the top of the applicable

information security and data privacy policies. Moreover, it was suggested by the cyber security manager of the case company that it would be good if the solution proposal is able to include the access restriction mechanisms being used by the identified customer. As it would then mean that we are utilizing a mechanism which is already being used the identified customer thereby giving more confidence to the customer.

As highlighted in section 3.5 of the current state analysis phase, the identified customer is using Oauth 2.0 as the industry standard protocol for restricting unauthorized usage of its services.

> *"We use OAuth 2.0 as the industry standard protocol for access authentication".* (IT Security Manager, Potential customer).

This development element was then included in final proposal wherein, the calls made to the installed base API are first authorized using Oauth 2.0 mechanism to verify authencity before executing the services further.

6.3 Final Proposal

After inclusions of the recommended developments (changed elements highlighted with bold red colored border), the final proposal to the API Platform Business model is as presented in Figure 16 below.

Key Partners
- Niche Products and solution Partners
- Collaborating partners
- Azure, AWS, Own home-grown Cloud partners
- Citrix and Cisco networking partners
- Development and maintanence partners
- Providing installed base data and expertise know-how

Partner Activities
- Providing actionable installed base data
- Providing business expertise and logics.
- Providing cloud and networking services
- Developing own products
- Business collaboration
- Developments & maintainence

Partner Costs
- Development & maintainence
- Infrastructure costs
- Management costs
- Supplying installed base data and development consulting.

Partner Value Proposition
- Possibility to develop and sell digital products and services around acquired installed base data
- Increased brand value in the digital way of doing business

Partner relationship management
- Supplier partners
- User partners
- Development partners

Partner Revenue streams
- Selling products and solutions developed around installed base data
- Selling Installed base data

Platform Purpose
- Enable Partner(s) to collaborate and sell digital products and services around acquired installed base data.
- Allow seamless "on demand" digital transactions at scale by "API Centricity" approach
- Hosting installed base API for Partners

Initial Investments costs
- Cloud Capacity
- Development
- Business development

Re-estimated ~ 210K €

Key Resources
- Cloud capacity
- Business development manager
- Development manager(s)
- Platform owner
- Partner manager
- Developer portal
- IT Security manager

Key Business and Technical activities
- Management of Partners.
- Business case and Finance management
- Business development
- Costing and Finance management
- Developments and maintainence
- Testing

Run costs
- Cloud capacity and networking
- Maintainence
- Management of partners

Estimated ~ 246K € Annually

Value Proposition of API
- Digitalization of installed base data assets
- "On demand" business collaboration
- Faster developments of own niche products and solutions
- Additional revenue streams

APIs Description
- Provides curated installed base data and knowhow to authorized partners

Developer Management
- Dedicated development managers
- Regular weekly and monthly meetings discussing SLA's and KPI's
- Online support portal for technical issues
- Installed base API versioning and documentation

Developer Segmentation
- 3rd party apps developers
- Data service(s) providers

API Monetization
- Monthly substciption based fees
- Volume Tiered based fees
- Pay as go direct transaction based fees

Platform Information Security and Data Privacy
- Enterprise level information security policies and data protection policies.
- Oauth 2.0 for authenticating the users of the API Platform.

Figure 16.Final proposal of the API platform business model for the case company.

The Final proposal was then submitted to the case company for approvals and implementations. Chapter 7 below covers the concluding part of the study.

7 Conclusion

This chapter of the thesis evaluates and summarizes the study from the objective to outcome.

7.1 Executive Summary

The objective of this thesis was to propose an API platform business model to the case company. This objective was defined based on the need of the case company to investigate possible API platform business model(s) solution for participation in the API economy of mining and minerals sector. The case company has this need arising out of own strategic goals to transform into a first-choice Digital solutions partner in the mining and minerals sector and exploring ways and means to achieve those goals.

An existing customer from the mining and minerals sector is seeking transformative solutions and willing to collaborate with the case company to digitally co-create & co-innovate, and unlock value through digitalization of installed base data assets.

Based on the above background, this thesis was undertaken. This thesis research started by conducting an analysis on the current state of API Platform business model within the case company. Critical data for analysis was collected from identified internal and external key stakeholders. Additional data for analysis was collected from available internal documents, intranet and from the website of one competitor operating in the same domain of the case company. The current state analysis led to discovering that relevant API platform business models are not available within the case company. This discovery led to selecting “API Economy”, “Focus on Purpose driven Platforms” and “API Business models” as focus areas for developing the initial proposal of the API platform business model for the case company.

To develop the initial proposal, first, available literature and industry best practices were explored to acquire existing knowledge and best practices for the API platform business model. From the acquired existing knowledge and best practices, the business model canvas (by Osterwalder and Pignuer, 2010), the service logic business model canvas (by Ojasalo and Ojasalo, 2015), Platform purpose (by Vitalari and Shaughnessy, 2012, cited in: Holley et.al, 2014) and the API Model canvas (by Nordicapis.com, Moilanen,

2016) were selected. Relevant elements from these selected model canvasses and from the theoretical framework were merged to construct a conceptual framework. This conceptual framework was then used as a guide and basis for co-creation of the initial solution proposal.

For co-creation, the enterprise architect belonging to architecture unit, business development manager belonging to sales unit and account manager (of the identified customer) belonging to delivery unit from the case company were involved. This involvement ensured that a viable initial proposal of the API platform business model is built. The initial proposal clearly states the involved key elements, briefly listing the characteristics and or activities of those key elements in the form of business model canvas (by Osterwalder and Pignuer, 2010), a widely accepted way of presenting a bird’s eye view to the viewers. Furthermore, each key element has a detailed explanation providing the viewers with an in-depth understanding of the purpose and the functions of listed key elements.

Finally, the initial solution proposal was validated by the key stakeholders, who were also involved in the co-creation. Additionally, it was also validated by the business development director and the cyber security manager of the case company. The recommended development actions collected during the validating sessions, namely, de-coupling the cloud and networking partners dependencies, inclusion of additional security measures and re-calculations of investment costs to include extra human efforts were implemented to prepare the final proposal of the API Platform business model for the case company.

In case the case company proceeds ahead with selecting and implementation of this proposal of the API Platform business model, there will be some digital transformation challenges being experienced generally in terms of people, processes and technology changes. Nevertheless, successful implementation of this proposal for the API platform business model will allow the case company to achieve a critical milestone and take a step closer in the direction of realizing own strategic goal of becoming first-choice partner in digital transformations market.

7.2 Next Steps and Recommendations toward Implementation

The outcome of this thesis presented a research-based API platform business model proposal. In-order to proceed further with practical implementation, few key points are worth taking into consideration.

First, it is recommended to allocate a budget to create an implementation plan, validate the identified business and technical resources and nominate a project manager for realization of the implementation plan. If possible, the project manager should be in-sourced as the personnel is already knowledgeable on the ways of working of the case company. Furthermore, the nominated project manager should have proper reporting and escalation channels to ensure that the implementation plan is proceeding as per schedule. Therefore, it recommended to form a steering committee consisting of business line, technical line and architecture line decisions makers. It is recommended that the schedule of the steering committee meetings should be agreed before implementation starts. Once the budget, management structure, plan and the schedule of the implementation is approved, necessary business and technical resources should be allocated for the execution. It is proposed that agile methodologies such as SAFe® should be utilized for the realization of the implementation plan. Agile methodology allows logically breaking bigger developments into smaller development units to be developed over a two-weeks development sprint. At the end of each sprint, it is possible to showcase the developed units to the necessary stakeholders and the identified customer for feedback. This approach allows in safeguarding from the failures happening in at advanced stages of the implementation.

Second, it is recommended to start the business acquisition activities well in advance before the implementation begins. For the current case, the identified customer from the minings and minerals sector is already onboarded and hence the logical next steps would be showcasing to the customer tangible implementation progresses and feedback sought at regular intervals. This will ensure that the customer is engaged and feels comfortable with the partnership. Whereas, it is suggested pro-actively acquire other identified partners.

Third, it is recommended to allocate a dedicated resource for run services related activities such as relationship management, contracting and invoicing.

Last but not the least, in humble yet practical wisdom, the thesis researcher recommends to consider conducting detailed risk analysis and develop risk mitigation plans to be key elements necessary for successful implementation and utilization of the API Platform services. Such implementations, wherein a new modern services platform is being commissioned introducing a change, effective risk management is of key essence to ensure that implementation proceeds smoothly as per schedule. Hence it is recommended to allocate a dedicated risk manager overseeing the risk management related activities.

7.3 Thesis Evaluation

The objective of this thesis was to propose an API platform business model to the case company. In this study, the thesis researcher has made an attempt to present a balanced proposal for the API platform business model based on the elements from the recognized traditional and modern business models. As an outcome of this thesis, an API platform business model proposal was developed for the case company.

In this thesis, the study researcher himself has identified roles to conduct and conclude this thesis research. The thesis researcher has professional background in the IT industry nevertheless he still feels that there is a possibility of taking a myopic view while identifying the roles to be involved as key stakeholders. He is of the opinion that the available information and knowledge for the current state analysis and from the academic literature was available in abundance and this also resulted in “information overload” phenomenon causing losing of the sight sometimes. There were some limitations in terms of confidentiality and restrictions due to standard practices policies of the enterprises i.e. the case company and the identified customer. In addition, the competitive analysis was done based on the available information from the competitor’s website. The thesis researcher feels that these limitations may have limited the ability of the researcher to propose a better API platform business model to the case company. At the same time, the thesis researcher feels that the study progressed according to the research design and satisfied the evaluation criterions, as explained above, while delivering the outcome in line with the identified objective.

This thesis was also evaluated based on the criteria of relevance, validity, credibility, conformability and reliability.

According to Theitart (2001, 118), the research is relevant if its main objective is to understand or explain reality, that is - underline a problem. The objective of this study was defined based on the identified business challenge of the case company. Before investing efforts into the research design and approaches, key stakeholders from the internal staff of the case company were identified and an expected outcome was aligned with them. The relevance was ensured by developing an outcome consistent to the objective and conducting validations from the identified key stakeholders, who were also involved in the co-creation of the initial proposal. Additional validation was done by involving business development director and IT cyber security manager of the case company to provide new perspective strengthening the relevance more.

According to Shenton (2004), credibility means the degree to which the findings of the qualitative research make sense. The thesis adopted a well-recognized method of doing research i.e. qualitative method. The qualitative data was collected by conducting theme interviews with key stakeholders identified from internal staff of the case company and the staff of the identified customer. Involvement of internal staff ensured the development of early familiarity with the culture of the case company. The contributions of the informants were willingly and voluntary. Confidentiality was assured at the beginning facilitating an open dialogue with the informants. Additional data was collected from available internal documents and from the website of a competitor. Furthermore, academic literature was researched to gather applicable best practices.

According to Shenton (2004), confirmability means the objectivity of the researcher and the assurance that the findings originate directly from the informants whereas, dependability means its reliability, consistency and accuracy (Shenton, 2004.) At the beginning of this thesis, an in-depth methodological description and diagram to demonstrate the integrity to be scrutinized and audit trail were made available. Triangulation was done to maintain the researcher’s objectivity by gathering data and knowledge from reliable sources such as, internal staff of the case company, staff from the identified customer, competitor’s website. Additionally, the conceptual framework of this thesis was constructed by merging of the relevant elements from available academic literature. This conceptual framework was then used to co-create a proposal for the API platform business model. The co-created proposal was then validated by the identified

key stakeholders belonging to business, architecture and delivery line organizations of the case company.

7.4 Closing Words

Personally, while working on this master's thesis, I have learnt a lot about how to identify, research, develop and deliver topics of interest in a structured way. The process of writing the thesis was laborious yet very structured and productive. I have learnt during this study, that the gate model is agnostic in nature and hence can be applied in professional field as well.

When doing research, it was noticed that, like the case company, many well-known IT services providers are exploring possible modern business models to participate in the API economy.

The thesis researcher feels that proper implementation of the proposed API platform business model will allow the case company to create a success story within the API economy of the minings and minerals sector. In turn, creating such success story will help the case company in progressing towards becoming a first-choice Digital transformation partner in the API economy space of the mining and minerals sector.

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